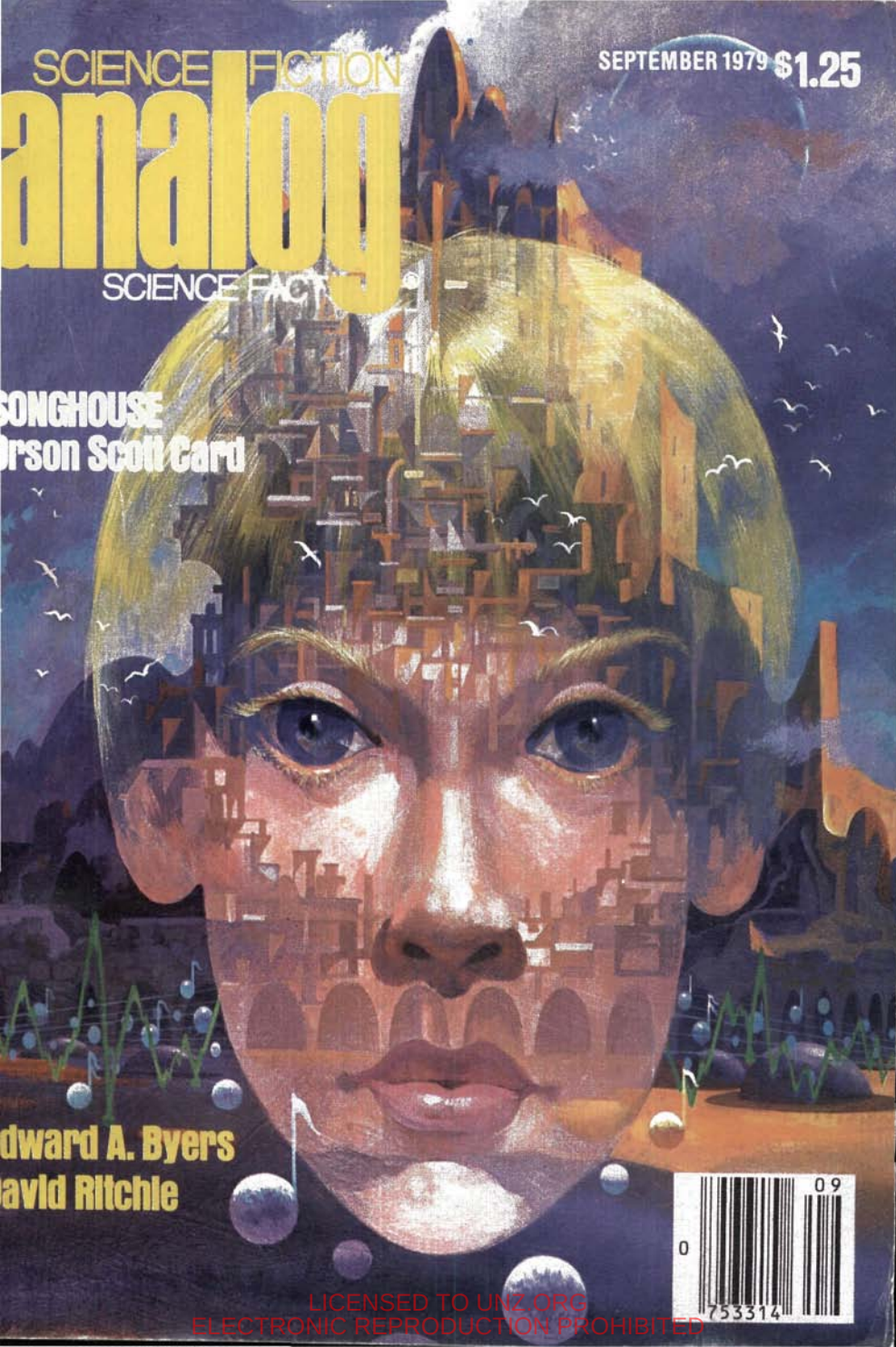

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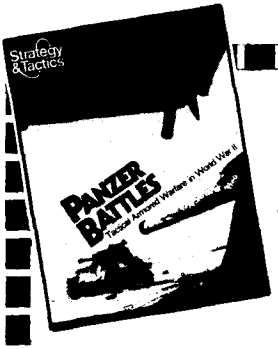

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editorial by ***Stanley Schmidt***

Irreproducible

Since a very early period of human history (or prehistory) there has existed a class of people capable of producing emanations producing demonstrable (and sometimes powerful, though not always identical) effects on the psychological state of other people. Some of these practitioners have used mechanical devices to produce or modify these emanations; others work completely without external aids. In no case is direct physical contact necessary between the person producing the emanations and the person influenced by them, and the effects can be propagated over considerable distances. A few people seem to have an innate ability to produce these psycho-effective emanations; others don't, but can be *trained* to produce them, with or without auxiliary instruments; still others appear quite devoid of ability, even when subjected to intensive attempts at training. Even among skilled practitioners, effectiveness may vary considerably from one occasion to another. Occasionally, for no reason which is clear to the practitioner, attempts to perform may fail totally.

If you've been reading this magazine long enough, it probably sounds like I'm talking about parapsychology and psionics. It is claimed in some circles that certain individuals are capable of such feats as telepathy and psychokinesis, and that "psionic machines" such as that invented by T. Galen Hieronymus can aid users in gaining information or influencing people or objects at a distance. In most of the scientific community, such claims tend to be viewed (to put it charitably) with skepticism. A major reason for the skepticism is the lack of reproducibility of these phenomena—a complaint with several facets, including the fact that none of the alleged practitioners is completely reliable, few appear to do much better than pure chance, and many experimental subjects show no effect at all.

But these things are *not* what I was talking about in my first paragraph.

I was talking about music, and I've never yet met anybody who questioned the existence of music. Musicians

Phenomena

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have been a part of human cultures at least as far back as human cultures have been traced through archaeological remains. Its ability to exert a powerful influence on emotions has been well known for about as long—which is why it's been kept around—and is again demonstrated at many places on Earth at any time of any day. The influence is not identical for all listeners—I have, for example, heard two simultaneous listeners to the same song describe it as "soothing" and "getting on my nerves." Some musicians sing; others play violins or trombones ("mechanical devices"). Both singers and instrumentalists, in recent times, have used other devices such as amplifiers, fuzz-boxes, radio transmitters, and tape recorders to intensify, alter, spread, store, and disseminate their emanations. Unaided singers and players can be clearly heard, under favorable circumstances, at distances of hundreds of meters; with radio, they can influence listeners a hemisphere away. Hardly any randomly selected experimental subject can produce anything remotely resembling music from a violin—but nobody suggests that this lack of reproducibility for all subjects proves that the violin is not a musical instrument. It's cheerfully conceded that both talent (the raw material from which competence can be made) and extensive training are necessary to make the thing work. Even a good violinist will have an occasional bad day, and a singer with laryngitis is not much fun to hear.

Suppose I am promised a broadcast performance by the Cleveland Orchestra and, unknown to me, my FM tuner has blown a transistor. When I turn it on at the appointed hour, nothing comes out. Am I justified in concluding that said orchestra's alleged ability to make moving music is a fraud?

The example may seem a bit farfetched—because "everybody knows"music works when all the machinery is in good order—but the logic is uncomfortably close to that often used to write off such things as parapsychology. The parallels to music are quite striking. Why is it so widely assumed that one is real and the other isn't?

Please note carefully before either proceeding or taking pen in hand to assail my gullibility: I'm *not* saying that any or all of the paranormal phenomena are real (or that they're not). I'm not in a position to take a stand—any stand—on that question. I have far too little firsthand or documented data (though I have seen some happenings for which "coincidence" seems more than slightly strained as an explanation). What I am doing—*all* I am doing—is questioning whether those scientists who *know* there is nothing worth studying in parapsychology or psionics might not be a bit premature (if not unscientific).

Absence of complete proof is not complete proof of absence.

A recent issue of *New Scientist* contained a little item called "Testing

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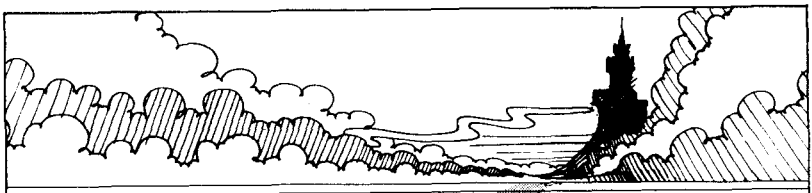

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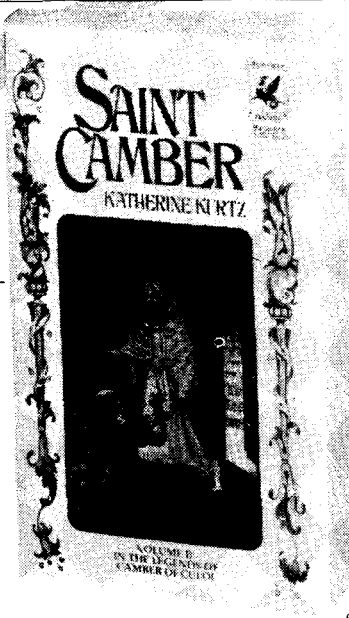

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Parapsychology," announcing a series of tests to be done by Paul Horowitz, chairman of the American Physical Society's forum on physics and society, attempting to repeat a series of experiments by Helmut Schmidt (no relation to your editor) of the Mind Science Foundation in San Antonio, Texas. The original experiments were reported to indicate "that individuals can significantly affect the outcome of what should be random phenomena"; the best results had one subject scoring 52% (rather than the chance 50%) in a ten-day series of 6400 tests with an "electronic coin flipper." I haven't heard how Horowitz's follow-up study came out, but the item of most interest for this discussion is the nature of some of the criticism which greeted his announcement to the APS forum. One critic pointed out that many previous "proofs" of psychokinetic phenomena had to be discarded either because of cheating (surely a valid reason) or because the results could not be repeated. Horowitz himself was "surprised and rather upset by the emphasis that Schmidt had put on the personal and motivational factor." (Schmidt had used initial screenings to pick out good performers, and claimed that "motivation and encouragement generated by the experimenter" were important in getting good results).

These criticisms raise two rather basic questions about research—especially research involving sentient beings—which may not yet be adequately resolved. First, the rejection of results because they cannot be repeated. In principle, this is a cornerstone of the scientific method which has contributed so much to human progress. In practice, it needs to be applied with great care. An experiment may not be repeatable because the effect supposedly being observed is not real—*or* because the outcome is dependent on some additional variable of which the experimenter is not aware and not in control.

Consider a man who has never seen a television set. He is given one, in the form of a sealed black box with no visible features except a screen and an on-off switch. He has no way of examining what's inside, and besides, he knows nothing of electronics. Furthermore, though he doesn't know it, this particular set has an intermittently loose connection (all too familiar to any repairman) and he has to do his experimenting with the box aboard a train on a bumpy track. *You* know that the jolting of the train is causing the bad connection to come and go. *He* only knows that *sometimes* when he turns the switch on a picture appears, but *usually* it doesn't.

On this basis of *his* observations, is television real—or is the picture he sometimes thinks he sees an experimental error?

How can you tell whether a suspected but erratic telepath or psychokinetic is doing nothing— or acting like a television set with a loose wire?

The second point raised by the *New Scientist* item is a thorny point in

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many (if not most) experiments with sentient beings. To what extent is an experiment invalidated if the results are affected by the experimenter's attitude toward the subject?

Musicians (and other performers) are very aware that the quality of their performance is likely to be strongly affected by feedback from the audience. Good audiences, in general, get better shows.

That's another editorial in itself, to which, very likely, I'll eventually return. For now, let me just raise the question, and then turn to the most significant difference I do see between music (which is generally accepted) and psi phenomena (which aren't). For music, there is an identifiable and well understood mechanism for at least the physical part of the interaction. (Mechanical and electromagnetic oscillations and waves can be described and predicted very quantitatively, though what goes on after the stimulus reaches the hearer's nervous system is far more complicated.) For parapsychological and psionic effects, no such explanation is at hand—but it would be well to remember that the absence of an identified and understood mechanism does not necessarily mean there is no mechanism at all. It may just mean that the mechanism has not yet been identified and explained. The fact that you don't know *how* something works doesn't mean it *doesn't.*

It's only rather recently, you know, that universal gravitation and Newton's laws of motion were quantitatively formulated, thus providing a detailed mechanism for the motions of the planets. That fact does not mean that those motions were any less real before Newton.

It may be that the "fringe" experimenters' eagerness to remedy this lack has actually reinforced the common scientific prejudice against them. I have seen a good many "explanations" of such things—telepathy, psionic machines, dowsing, correlations of astrological configurations with terrestrial phenomena—couched in terms apparently trying to imitate the jargon of better established fields ("eloptic energy," and such). Unfortunately, the couching was so imprecise that they came across as pseudo-scientific double talk. If these phenomena are real (which is an entirely different question from whether they are what their observers claim they are), gobbledygook "explanations" may do more harm than good by undermining their investigators' credibility and making additional study still less likely. It may simply be that attempts at explanation are premature. It is *not* necessary to explain something to establish its reality. If it is really new, a correct explanation (or, better, a good working model) is not likely to be feasible until long after the reality is established and a great deal of data is collected—without understanding. Only when you know *what* something does can you hope to explain *how* it does it.

Let me close by throwing out one *very* far-out possibility. So far I have

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spoken in such terms as: if these things are real, they may use brand-new mechanisms involving variables which we don't know about and can't control—hence "unrepeatable" experiments. But, for a moment, just suppose that there exists a class of phenomena which are really, intrinsically, *not* reproducible in the sense we take for granted—phenomena which, given literally indistinguishable circumstances, allow more than one possible outcome. This notion is not entirely without precedent—there are versions of it in the statistical behavior of very small particles in quantum mechanics. But let's suppose that such phenomena exist even at a macroscopic level—with telepathy and such as possible examples.

What we call scientific method is founded on the strict insistence that experiments, to be valid, must be repeatable by anyone with the right tools and techniques, always with the same results.

The validity of this approach rests on the hidden assumption that all phenomena being studied are reproducible in that sense. Would not this approach, by its very nature, systematically ignore or suppress any such class of phenomena as I have postulated?

If they exist, then, it may be that a fundamentally new way of thinking is needed to study them. This is not to suggest that the scientific method is not a valuable tool—it certainly is—but merely that it *may* not be the *only* tool. (A very fine screwdriver, you know, makes a lousy wrench.)

If a class of truly nonreproducible phenomena exists, how *can* it be studied?

I once posed this pair of questions to a science fiction class I was teaching, and noticed one of my best students (who happened to be a chemistry major) frowning intently. I asked him what was wrong.

"I don't like your question," he said.

"What don't you like about it?" I asked.

"I can't answer it."

I can't either, at the moment. But it might not hurt anything if a few people were to give it some thought.■

life elsewhere

When I contemplate the eventual possibility of finding life elsewhere, I am reminded of the cartoon where one character is saying to the other: 'Sometimes I think we are alone, and sometimes I think we are not.' In either case, it's a staggering thought.

DR. LEE A. DUBRIDGE

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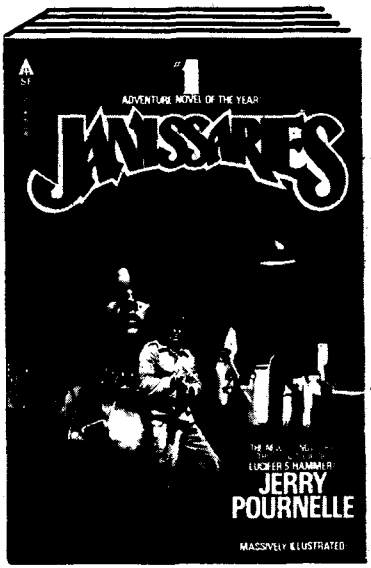

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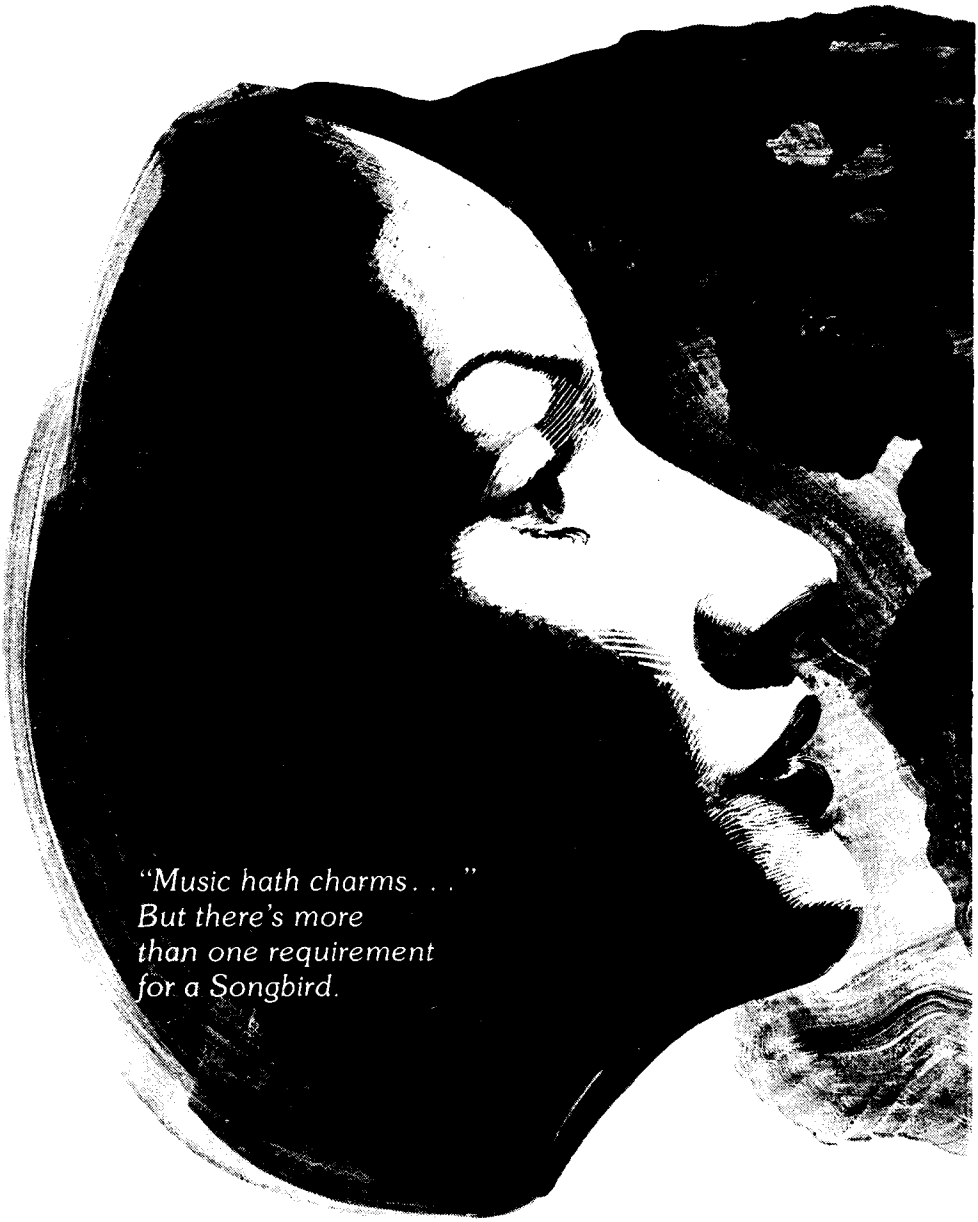

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Songhouse

By Orson Scott Card

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Prologue

Nniv did not go to meet Mikal's starship. Instead he waited in the rambling stone Songhouse, listening to the song of the walls, the whisper of the hundred young voices from the Chambers and the Stalls, the cold rhythm of the drafts. There were few in the galaxy who would dare to make Mikal come to them. Nniv was not daring, however. It did not occur to him that the Songmaster needed to go meet anyone.

The people who were not sheltered by the Songhouse walls were not so placid, however. Mikal's reputation was well-known, and Tew had been a bit slow about submitting to the Discipline of Frey. Who could have known that Mikal would not be content with ravaging the worlds he had already won, that instead he would govern wisely and brutally and well and would use those worlds as a springboard from which he now reached out farther and farther into the galaxy. Too many of the great leagues and nations had fallen, and now there were few worlds that even thought of resisting Mikal when his ships came. Instead—and the world of Tew was no different—the governments made it a point to impress Mikal with their loyalty to him, their desire to have him rule over them. Secretly, they all wished he would get swallowed up in a nova. Publicly, he had no stauncher allies.

But Mikal had no time for Tew. He had come (as most visitors to the planet came) to see the Songhouse. And for a man of wealth and power, there was only one reason to visit the Songhouse.

He wanted a Songbird, of course.

"You can't have a Songbird, sir," said the diffident young woman in the waiting room.

"I haven't come to argue with gatekeepers."

"Whom would you like to argue with? It will do you no good."

"The Songmaster. Nniv."

"You do not understand," the young woman explained. "Songbirds are given only to those who can truly appreciate them. We invite people to accept them. We do not take applications from anyone."

Mikal looked at her coldly. "I am not applying."

"Then what are you doing here?"

Mikal said no more. Merely stood, waiting. The young woman tried to argue with him, but he didn't answer. She tried to ignore him and go on with her work, but he waited for more than an hour, until she could stand no more. She got up and left without a word.

"What is he like?" sang Nniv, his voice low and comforting.

"Impatient," she said.

"Yet he waited for you." Correction did not give way to criticism in Nniv's voice. Ah, he is a kind master, the girl thought but did not say.

"He is stern," she said. "He is a ruler, and he will not believe there is anything he cannot get, anyone he cannot rule, anywhere he cannot fill with his presence."

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"No man can travel through space," Nniv answered gently, "and not know there are places that he cannot fill."

She bowed. "What should I tell him?"

"Tell him that I will see him."

She was startled. She was confused. She abandoned words, and sang her confusion. The song was meek and uncontrolled, for she would never be a master, not even a teacher, but wordlessly she asked Nniv why he would even listen to such a man, why he would risk having the rest of mankind think, the Songhouse treats all men alike, judging only on merit, not on power—except for Mikal.

"I will not be corrupted," Nniv sang gently.

"Send him away," she pleaded.

"Bring him to me."

She broke control and wept, then, and declared she could not do such a thing.

Nniv sighed. "Then send me Esste. Send me Esste, and be relieved of duty until Mikal leaves."

Mikal still stood in the gateroom an hour later, when the door opened again. This time it was not the gatekeeper. It was another woman, more mature, with darkness under her eyes and power in her bearing. "Mikal?" she asked.

"Are you the Songmaster?" Mikal asked.

"Not I," she said, and for a moment Mikal felt acutely embarrassed at having thought so. But why should I be embarrassed, he wondered, and shook off the feelings. The Songhouse weaves spells, said the common people on Tew, and it made Mikal uneasy. The woman led the way out of the room, humming. She said nothing, but her melody told Mikal he should follow, and so he pursued the thread of music through the cold stone halls. Doors opened here and there; windows let in the only light (and it was a dismal light of grey winter sky); in all the wandering through the Songhouse they met no other person, heard no other voice.

At last, after many stairs, they reached a high room. The High Room, in fact, though no one mentioned it. Seated at one end of the room on a stone bench unsheltered from the cold breeze through the open shutters was Nniv. He was old, his face more sag than features, and Mikal was startled. Ancient. It reminded Mikal of mortality, which at the age of forty he was just beginning to be aware of. He had sixty years yet, but he was no longer young and knew that time was against him.

"Nniv?" Mikal asked.

Nniv nodded, and his voice rumbled a low *mmmmm*.

Mikal turned to the woman who had led him. She was still humming. "Leave us," Mikal said.

The woman stayed where she was, looking at him as if without comprehension. Mikal grew angry, but he said nothing because suddenly her melody counseled silence, insisted on silence, and instead Mikal turned to Nniv. "Make her stop humming," he

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said. "I refuse to be manipulated."

"Then," Nniv said (and his song seemed to shout with laughter, though his voice remained soft), "then you refuse to live."

"Are you threatening me?"

Nniv smiled. "Oh, no, Mikal. I merely observe that all living things are manipulated. As long as there is a will, it is bent and twisted constantly. Only the dead are allowed the luxury of freedom, and then only because they want nothing, and therefore can't be thwarted."

Mikal's eyes grew cold then, and he spoke in measured voice, which sounded dissonant and awkward after the music of Nniv's speech. "I could have come here in power, Songmaster Nniv. I could have landed huge armies and weapons that would hold the Songhouse itself for ransom to work my will. If I intended to coerce you or frighten you or abuse you in any way, I would not have come alone, open to assassins, to ask for what I want. I have come to you with respect, and I will be treated with respect."

Nniv's only answer was to glance at the woman and say, "Esste." She fell silent. Her humming had been so pervasive that the walls fairly rung with the sudden quiet.

Nniv waited.

"I want a Songbird," Mikal said.

Nniv said nothing.

"Songmaster Nniv, I conquered a planet called Rain, and on that planet was a man of great wealth, and he had a Songbird. He invited me to hear the child sing."

And at the memory, Mikal could not contain himself. He wept.

His weeping took Esste and Nniv by surprise. This was not Mikal the Terrible. Could not be. For Songbirds, while they impressed everyone, could only be fully appreciated by certain people, people whose deepest places resonated with that most powerful of musics. It was known throughout the galaxy that a Songbird could never go to a person who killed, to a person of greed or gluttony, to a person who loved power. Such people could not really hear a Songbird's music. But there could be no doubt that Mikal had understood the Songbird. Both Nniv and Esste could hear his inadvertent songs too easily to be mistaken.

"You have damaged us," Nniv said, his voice full of regret.

Mikal composed himself as best he could. "I, damaged you? The memory of your Songbird destroys me."

"Uplifts you."

"Wrecks my self-composure, which is the key to my survival. How have I damaged you?"

"By proving to us that you do indeed deserve a Songbird. You know what that will do, I'm certain. Everyone knows that the Songhouse does not bend to the powerful where Songbirds are concerned. And yet—we will give *you* one. I can hear them now; 'Even the Songhouse sells out to Mikal.'" Nniv's voice was a raucous and perfectly accurate imitation of the speech of the common man, though of course there was no such creature in the galaxy. Mikal laughed.

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"You think it's funny?" Esste asked, and her voice pierced Mikal deeply and made him wince.

"No," he answered.

Nniv sang soothingly, and calmed both Esste and Mikal. "But Mikal, you know also that we set no date for delivery. We must find the right Songbird for you, and if we don't find one before you die, there can be no complaint."

Mikal nodded. "But hurry. Hurry, if you can."

Esste sang, her voice ringing with confidence, "We never hurry. We never hurry. We never hurry." The song was Mikal's dismissal. He left, and found his own way out, guided by the fact that all doors but the right ones were locked against him.

"I don't understand," said Nniv to Esste after Mikal had gone.

"I do," Esste said.

Nniv whispered his surprise in a steeply rising hiss that echoed from the stone walls and blended with the breeze.

"He's a man of great personal force and power," she told him. "But he has not been corrupted. He believes he can use his power for good. He longs to do it."

"An altruist?" Nniv found it difficult to believe.

"An altruist. And this," said Esste, "is his song." She sang, then, occasionally using words, but more often shaping meaningless syllables with her voice, or singing strange vowels, or even using silence and wind and the shape of her lips to express her understanding of Mikal.

At last her song ended, and Nniv's own voice was heavy with emotion as he sang his reaction. That, too, ended, and Nniv said, "If he truly is what you sing him to be, then I love him."

"And I," Esste said.

"Who will find a Songbird for him, unless it's you?"

"I will find Mikal's Songbird."

"And teach this bird?"

"And teach."

"Then you will have done a life's work."

And Esste, accepting the heavy challenge (and the possible inestimable honor), sang her submission and dedication and left Nniv alone in the High Room to hear the song of the wind and answer as best he was able.

For seventy-nine years Mikal had no Songbird. In all that time, he conquered the galaxy, and imposed the Discipline of Frey on all mankind, and established Mikal's Peace so that every child born had a reasonable hope of living to adulthood, and appointed a high quality of government for every planet and every district and every province and every city there was.

Still he waited. Every two or three years he sent a messenger to Tew, asking the Songmaster one question: When?

And the answer always came back: Not yet.

And Esste was made old by the years and the weight of her life's work. Many Songbirds were discovered because of her search, but none that would sing properly to Mikal's

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own song.

Until she found Ansset.

Esste

There were many ways a child could turn up in the child markets of Doblay-Me. Many children, of course, were genuine orphans, though now that wars had ended with Mikal's Peace orphanhood was a social position much less often achieved. Others had been sold by desperate parents who had to have money—or who had to have a child out of their way and hadn't the heart for murder. More were bastards from worlds and nations where religion or custom forbade birth control. And others slipped in through the cracks.

Ansset was one of these when a seeker from the Songhouse found him. He had been kidnapped and the kidnappers had panicked, opting for the quick profit from the baby trade instead of the much riskier business of arranging for ransom and exchange. Who were his parents? They were probably wealthy, or their child wouldn't have been worth kidnapping. They were white, because Ansset was extremely fair skinned and blond. But there were trillions of people answering to that description, and no government agency was quite so foolish as to assume the responsibility of returning him to his family.

So Ansset, whose age was unknowable but who couldn't be more than three years old, was one of a batch of a dozen children that the seeker brought back to Tew. All the children had responded well to a few simple tests—pitch recognition, melody repetition, and emotional response. Well enough, in fact, to be considered potential musical prodigies. And the Songhouse had bought—no, no, people are not *bought* in the child markets—the Songhouse had *adopted* them all. Whether they became Songbirds or mere singers, masters or teachers, or even if they did not work out musically at all, the Songhouse raised them, provided for them, cared about them for life. *In loco parentis,* said the law. The Songhouse was mother, father, nurse, siblings, offspring, and, until the children reached a certain level of sophistication, God.

"New," sang a hundred young children in the Common Room, as Ansset and his fellow marketed children were ushered in. Ansset did not stand out from the others. True, he was terrified—but so were the rest. And while his nordic skin and hair put him at the extreme end of the racial spectrum, such things were studiously ignored and no one ridiculed him for it, any more than they would have ridiculed an albino.

Routinely he was introduced to the other children; routinely all forgot his name as soon as they heard it; routinely they sang a welcome whose tone and melody were so confused that it did nothing to allay Ansset's fear; routinely Ansset was assigned to Rruk, a five-year-old who knew the ropes.

"You can sleep by me tonight," Rruk said, and Ansset dumbly nodded. "I'm *older*," Rruk said. "In maybe a few months or sometime

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soon anyway I get a stall." This meant nothing to Ansset. "Anyway, don't piss in your bed because we never get the same one two nights in a row."

Ansset's three-year-old pride was enough to take umbrage at this. "Don't piss in bed." But he didn't sound angry—just afraid.

"Good. Some of 'em are so scared they do."

It was near bedtime; new children were always brought in near bedtime. Ansset asked no questions. When he saw that other children were undressing, he too undressed. When he saw that they found nightgowns under their blankets, he too found a nightgown and put it on, though he was clumsy at it. Rruk tried to help him, but Ansset shrugged off the offer. Rruk looked momentarily hurt, then sang the love song to him.

I will never hurt you.
I will always help you.
If you are hungry
I'll give you my food.
If you are frightened
I am your friend.
I love you now
And love does not end.

The words and concepts were beyond Ansset, but the tone of voice was not. Rruk's embrace on his shoulder was even more clear, and Ansset leaned on Rruk, though he still said nothing and did not cry.

"Toilet?" Rruk asked.

Ansset nodded, and Rruk led him to a large room adjoining the Common, where water ran swiftly through trenches. It was there that he learned that Rruk was a girl. "Don't stare," she said. "Nobody stares without permission." Again, Ansset did not understand the words, but the tone of voice was clear. He understood the tone of voice instinctively, as he always had; it was his greatest gift, to know emotions even better than the person feeling them.

"How come you don't talk except when you're mad?" Rruk asked him as they lay down in adjoining beds (as a hundred other children also lay down).

It was now that Ansset's control broke. He shook his head, then turned away, burying his face under the blankets, and cried himself to sleep. He did not see the other children around him who looked at him with distaste. He did not know that Rruk was humming a tune that meant, "Let be, let alone, let live."

He did know, however, when Rruk patted his back, and he knew that the gesture was kind; and this was why he never forgot his first night in the Songhouse and why he could never feel anything but love for Rruk, though he would soon far surpass her rather limited abilities.

"Why do you let Rruk hang around you so much when she isn't even a Breeze?" asked a fellow student once, when Ansset was six. Ansset did not answer in words. He answered with a song that made the questioner break Control, much to his humiliation, and weep openly. No one else ever challenged Rruk's claim on Ansset. He had no friends, not really, but this song for Rruk was too powerful to

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challenge, and no one ever did.

2

Ansset held on to two memories of his parents, though he did not know these dream people were his parents. They were White Lady and Giant Man, when he thought to put names to them at all (and he never spoke of them to anyone), and he only thought of them when he had dreamed the dreams of them the night before.

The first memory was of the White Lady whimpering, lying on a bed with huge pillows. She was staring into nothingness, and did not see Ansset as he walked into the room. His step was unsure. He did not know if she would be angry that he had come in. But her soft, whipped cries drew him on, for it was a sound he could not resist, and he came and stood by the bed where she rested her head on her arm. He reached out and patted her arm. Even in the dream the skin felt hot and fevered. She looked at him, and her eyes were deep in tears. Ansset reached to the eyes, touched the brow, let his tiny fingers slide down, closing the eyes, caressing the lids so gently that the White Lady did not recoil. Instead she sighed, and he caressed all her face as her whimpers softened into gentle humming.

It was then that the dream went awry, ending in odd ways. Always Giant Man came in, but what he did was a mystery of rumbling voice, embraces, shouts. Sometimes he also lay on the bed with White Lady. Sometimes he picked Ansset up and took him on strange adventures that ended in waking. Sometimes the White Lady kissed him good-bye. Sometimes she did not notice him once the Giant Man came into the room. But the dream always began the same, and the part that never changed was memory.

The other memory was of the moment of kidnapping. Ansset was in a very large place with a distant roof that was painted with strange animals and distorted people. Loud music came from a lighted place where everyone was always moving. Then there was a deafening noise and the place became all light and noise and conversation, and White Lady and Giant Man walked among the crowd. There was pushing and jostling, and someone stepped between White Lady and Ansset, breaking their handhold. White Lady turned to the stranger, but at the same moment Ansset felt a powerful hand grip his. He was pulled away, bumping harshly through the crowd. Then the hand pulled him up, hurting his arm, and for a moment, lifted above the heads of the crowd, Ansset saw White Lady and Giant Man for the last time, both of them pushing through the crowd, their faces fearful, their mouths open to cry out. But Ansset could never remember hearing them. For a blast of hot air struck him and a door closed, and he was outside in a blazing hot night, and then he always, always woke up, trembling but not crying, because he could hear a voice saying, "Quiet, Quiet, Quiet," in tones that meant fear and falling and fire and shame.

"You do not cry," said the teacher,

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a man with a voice that was more comforting than sunlight.

Ansset shook his head. "Sometimes," he said.

"Before," answered the teacher. "But now you will learn Control. When you cry you waste your songs. You burn up your songs. You drown your songs."

"Songs?" asked Ansset.

"You are a little pot full of songs," said the teacher, "and when you cry, the pot breaks and all the songs spill out ugly. Control means keeping the songs in the pot, and letting them out one at a time."

Ansset knew pots. Food came from a pot. He thought of songs as food, then, besides knowing they were music.

"Do you know any songs?" asked the teacher.

Ansset shook his head.

"Not any? Not any songs at all?"

Ansset looked down.

"Ansset, songs. Not words. Just a song that has no words but you just sing, like this, Ah—" and the teacher sang a short stretch of melody that spoke to Ansset, that said, Trust, Trust, Trust.

Ansset smiled. He sang the same melody back to the teacher. For a moment the teacher smiled, then looked startled, then reached out with wondering eyes and touched Ansset's hair. The gesture was kind. And so Ansset sang the love song to the teacher. Not the words, because he had no memory for words yet. But he sang the melody as Rruk had sung it to him, and the teacher wept. It was Ansset's first lesson on his first full day at the Songhouse, and the teacher wept. He did not understand until later that this meant that the teacher had lost Control and would be ashamed for weeks until Ansset's gifts were more fully appreciated. He only knew that when he sang the love song, he was understood.

3

"Cull, you're beyond this," said Esste, with grief and sympathy and reproach. "You're a good teacher, and that's why we trusted you with the new ones."

"I know," Cull said. "But Esste—"

"You wept for minutes. Minutes before you regained Control. Cull, have you been ill?"

"Healthy."

"Are you unhappy?"

"I wasn't, not until after—after. I wasn't weeping for grief, Mother Esste, I was weeping for—"

"For what?"

"Joy."

Esste hummed exasperation and noncomprehension.

"The child, Esste, the child."

"Ansset, yes? The blond one?"

"Yes. I sang him trust, and he sang it back to me."

"He shows promise then, and you broke Control in front of him."

"You are impatient."

Esste bowed her head. "I am." Her posture said shame. Her voice said she was still impatient and only a little ashamed after all. She could not lie to

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a teacher. Of this she was certain.

"Listen to me," pleaded Cull.

I'm listening, said Esste's reassuring sigh.

"Ansset sang my trust back to me note for note, perfectly. Nearly a minute, and it wasn't easy. And he didn't sing just the melody. He sang pitch. He sang nuance. He sang every emotion I had said to him, except that it was stronger. It was like singing into a long hall and having the sound come back at you louder than you sang it."

Do you exaggerate? asked Esste's hum.

"I was shocked. And yet delighted. Because I knew in that instant that here we had a true prodigy. Someone who might become a Songbird—"

Careful, careful, said the hiss from Esste's mouth.

"I know it's not my decision, but you didn't hear his answer. It's his first day, his first lesson—and anyway, that was nothing, nothing at all to what came after. Esste, he sang the love song to me. Rruk only sang it to him once yesterday. But he sang the whole thing—"

"Words?"

"He's only three. He sang the melody and the love, and Esste, Mother Esste, no one has ever sung such love to me. Uncontrolled, utterly open, completely giving, and I couldn't contain it. I couldn't, Esste, and you know my Control has never faltered before."

Esste heard Cull's song, and the teacher wasn't lying to protect himself. The child was remarkable. The child was powerful. Esste decided she would meet the child.

After she met him, in a brief encounter at the Galley at breakfast, she reassigned herself to be his teacher. As for Cull, the consequence of his loss of Control was much lighter than the usual, and as Esste taught Ansset day after day, she sent word for Cull to be advanced step by step until within a few weeks he was a teacher of new ones again, and Esste put the word around so that none would criticize Cull, "With this child, any teacher would have lost Control."

And there was a dancing quality to her walk and a warmth to her voice that made every teacher and master and even the Songmaster in the High Room realize that Esste at last hoped, perhaps even let herself believe, that her life's work might be within reach. "Mikal's Songbird?" another Songmaster presumed to ask her one day, though his melody told her she need not answer if she didn't want to.

She only hummed high in her head, and leaned her head against the stone, and laid her hand on her cheek so that the Songmaster laughed. But he had his answer. She could clown and play to try to hide her hopes, but the very clowning and playing were message enough. Esste was happy. This was so unusual it even startled the children.

4

It was unheard of for a Songmaster to teach new ones. The new ones did not know it, of course, not at first, not until they had learned enough of the basics to advance, as a class, to

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become Groans. There were other Groans, some as old as five or six, and like all children they had their own society with its own rules, its own customs, its own legends. Ansset's class of Groans soon learned that it was safe to be pugnacious and obstinate with a Belch, but never with a Breeze; that it meant nothing where you slept, but you sat at table with your friends; that if a fellow Groan sang you a melody, you must deliberately make a mistake in singing it back to him, or he'll think you're bragging.

Ansset learned all the rules quickly, because he was bright, and made everyone in his class think of him as a friend, because he was kind. No one but Esste noticed that he did not exchange secrets in the toilet, did not join any of the inner rings that constantly grew and waned among the children. Instead, Ansset worked harder at perfecting his voice. He hummed almost constantly. He cocked his head when masters and teachers talked without words, using only melody to communicate. His focus was not on the children, who had nothing to teach him, but on the adults.

While none of the children were conscious of his separation from them, unconsciously they allowed for it. Ansset was treated with deference. The hazing by the Belches (no, not in front of the teachers—in front of the teachers they're *Bells*), which was usually at the level of urinating on a Groan so he had to shower again or spilling his soup day after day so that he got in trouble with the cooks, the hazing somehow bypassed Ansset.

And he entered the mythology of the Groans very quickly. There were other legendary figures—Jaffa, who in anger at her teacher burst one day into a Chamber and sang a solo, and then, instead of being punished, was advanced to be a Breeze without ever having to be a Belch at all; Moom, who stayed a Groan until he was nine years old, and then suddenly got the hang of things and passed through Bells and Breezes in a week, entered Stalls and Chambers and was out as a singer before he turned ten; and Dway, who was gifted and ought to have become a Songbird, but who could not stop rebelling and finally escaped the Songhouse so often that she was thrust out and put with a normal boarding school and never sang another note. Ansset was not so colorful. But his name passed from class to class and from year to year so that after he had been a Groan for only a month, even singers in Stalls and Chambers knew of him, and admired him, and secretly resented him.

He will be a Songbird, said the growing myth. And this was not resented by the children his own age, because while all of them could hope to be a singer, Songbirds only came every few years, and some chidren passed from Common Rooms into Stalls and Chambers without ever having known someone who became a Songbird. Indeed, there was no Songbird at all in the Songhouse now—the most recent one, Wymmyss, had been placed out only a few weeks

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before Ansset came, so none of his class had ever heard a Songbird sing.

Of course, there were former Songbirds among the teachers and masters, but that was no help, because their voices had changed. How do you become a Songbird? Groans would ask Belches, and Belches would ask Breezes, and none of them knew the answer, and few dared hope that they would achieve that status.

"How do you become a Songbird?" Ansset sang to Esste one day, and Esste could not hide her startlement completely, not because of the question, though it was rare for a child to ask such an open question, but because of the song, which also seemed to ask, Were you a Songbird, Esste?

"Yes, I was a Songbird," she answered, and Ansset, who had not yet mastered Control, revealed to her that that *was* the question he had been asking. The boy was learning songtalk, and Esste would have to be careful to warn the teachers and masters not to use it in front of him unless they didn't mind being understood.

"What did you do?" Ansset asked.

"I sang."

"Singers sing. Why are Songbirds different?"

Esste looked at him narrowly. "Why do you want to be a Songbird?"

"Because they're the perfect ones."

"You're only a Groan, Ansset. You have years ahead of you." The statement was wasted, she knew. He could sing, he could hear song, but he was still almost an infant, and years were too long for him to grasp.

"Why do you love me?" Ansset asked her, this time in front of the entire class.

"I love all of you," Esste sang, and all the children smiled at the love that was in her voice.

"Why do you sing to me more than to the others, then?" Ansset demanded, and Esste heard in his song another message: The others are not my friends because you set me apart.

"I don't sing to anyone more than to anyone else," Esste answered, and in songtalk she said, "I will be more careful." Did he understand? At least he seemed satisfied with her answer, and did not ask again.

Ansset became one of the great legends, however, when he was promoted from Groan to Belch earlier than the rest of his class—and instead of Esste remaining with the class, she moved with Ansset. It was then that Ansset realized that not only was it unusual for a Songmaster to be doing a teacher's job, but also Esste was teaching, not the class, but him. Ansset. Esste was teaching Ansset.

The other children noticed this at least as quickly as Ansset did, and he found that while all of them were nice to him, and all of them praised him, and all of them sought to be near him and eat with him and talk to him, none of them sang the love song to him. And none of them was his friend, for they were afraid.

5

A lesson.

Esste took her class of Bells out of the Songhouse. They rode in a flesket,

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so that all of them could see outside. It was always a wonder to them, leaving the cold stone walls of the Songhouse. Groans were never taken out; Breezes often were; and Bells knew that the trips in the flesket were only a taste of things to come.

They went through deep forests, skimming over the underbrush as they followed a narrow road cut between tall trees. Birds paced them, and animals looked up bemusedly as they passed.

To children schooled to singing, however, the miracle came when they left the flesket. Esste had the driver, who was only eighteen and therefore just returned from being a singer outside, stop them by a small waterfall. Esste led the children to the side of the stream. She commanded silence, and because Bells have the rudiments of Control, they were able to hold utterly still and listen. They heard birdsong, which they longed to answer; the gurgle of the stream as it slopped against the rocks and inlets of the shore; the whisper of breezes through the leaves and grass.

They sat for fifteen minutes, which was near the limit of their Control, and then Esste led them closer to the waterfall. It wasn't a long walk, but it was slick and damp as they approached the mist rising from the foot of the falls. There had been a landslide many years before, and instead of falling into the pool it had carved out of rock, the cascade tumbled onto rock and sprayed out in all directions. The children sat only a dozen meters away, and the water soaked them.

Again, silence. Again, Control. But this time they heard nothing but the crash of the water on the rock. They could see birds flying, could see leaves moving in the wind, but could hear nothing of that.

After only a few minutes Esste released them. "What do we do?" asked one of the children.

"What you want," answered Esste.

So they gingerly waded at the edge of the pool, while the driver watched to make sure no one drowned. Few of them noticed when Esste left; only Ansset followed her.

She led him, though she gave no sign she knew he was following, to a path leading up the steep slope to the top of the falls. Ansset watched her carefully, to see where she was going. She climbed. He climbed after. It was not easy for him. His arms and legs were still clumsy with childhood, and he grew tired. There were hard places, where Esste had only to step up, while Ansset had to clamber over rises half as high as he was. But he did not let Esste out of his sight, and she, for her part, did not go too quickly for him. She had gathered her gown for the climb, and Ansset looked curiously at her legs. They were white and spindly, and her ankles looked too thin to hold her up. Yet she was nimble enough as they climbed. Ansset had never thought of her as having legs before. Children had legs, but masters and teachers rushed along with gowns brushing the floor. The sight of legs, just like a child's, made Ansset wonder if Esste was like the girls in the shower and toilet. He imagined her squatting over

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the trench. It was a sight that he knew was forbidden, yet in his mind he violated even good manners and stared and stared.

And came face to face with Esste at the top of the hill.

He was startled, and showed it. She only murmured a few notes of reassurance. You were meant to be here, her song said. Then she looked out beyond the hill, and Ansset looked after her. Behind them was forest in rolling hills, but here a lake spread out to lap the edges of a bowl of hills. Trees grew right to the edge, except for a few clearings. The lake was not large, as lakes go, but to Ansset it was all the water in the world. Only a few hundred meters away, the lake poured over a lip of rock to make the waterfall. But here there was no hint of the violence of the fall. Here the lake was placid, and waterbirds skimmed and dipped and swam and dived, crying out from time to time.

Esste questioned him with a melody, and Ansset answered, "It's large. Large as the sky."

"That is not all you should see, Ansset, my son," she said to him. "You should see the mountains around the lake, holding it in."

"What makes a lake?"

"A river comes into this valley, pouring in the water. It has no place to go, so it fills up. Until some spills out at the waterfall. It can fill no deeper than the lowest point. Ansset, this is Control."

This is Control. Ansset's young mind struggled to make the connection.

"How is it Control, Ansset?"

"Because it is deep," Ansset answered. He waited.

"You are guessing, not thinking."

"Because," said Ansset, "it is all held in everywhere except one place, so that it only comes out a little at a time."

"Closer," said Esste. Which meant he was wrong.

Ansset looked at the lake, trying for inspiration. But all he could see was a lake.

"Stop looking at the lake, Ansset, if the lake tells you nothing."

So Ansset looked at the trees, at the birds, at the hills. He looked all around the hills. And he knew what Esste wanted him to know. "The water pours out of the low place."

"And?" Not enough yet?

"If the low place were higher, the lake would be deeper."

"And if the low place were lower?"

"There wouldn't be a lake."

And Esste broke off the conversation. Or rather, changed languages, because now she sang, and the song exulted. It was low and it was not loud, but it spoke, without words, of joy; of having found after long searching, of having given a gift carried far too long; of having, at last, eaten when she thought never to eat again. I starved for you, and you are here, said her song.

And Ansset understood all the notes of her song, and all that lay behind the notes, and he, too, sang. Harmony was not taught to Bells, but Ansset sang harmony. It was wrong, it was only countermelody, it was dissonant to Esste's song, but it was nevertheless an augmentation of her joy, and where a mere teacher, with less Control, might have

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been overcome by Ansset's echo of the deepest parts of her song, Esste had Control enough to channel the ecstasy through her song. It became so powerful, and Ansset was so receptive to it, that it overcame him, and he sobbed and clung to her and still tried to sing through his tears.

She knelt beside him and held him and whispered to him, and soon he slept. She talked to him in his sleep, told him things far beyond his comprehension, but she was laying pathways through his mind. She was building secret places in his mind, and in one of them she sang the love song, sang it so that at a time of great need it would sing back to him and he would remember, and be filled.

When he woke, he remembered nothing of having lost Control; nor did he remember Esste speaking to him. But he reached out and took her hand, and she led him down the hill. It felt right to him to hold her hand, though such familiarity was forbidden between children and teachers, partly because his body had vague memories of holding the hand of a woman whom he completely trusted, and partly because he knew, somehow, that Esste would not mind.

6

Kya-Kya was a Deaf. At the age of eight she had still not progressed beyond the Groan level. Her Control was weak. Her pitch was uncertain. It was not lack of native ability—the seeker who found her had not made a mistake. She simply could not pay attention well enough. She did not care.

Or so they said. But she cared very much. Cared when the children her age and a year younger and a year younger than that passed her by. All were kind to her and few despaired, because it was well known that some sang later than others. She cared even more when she was gently told that there was no point in going on. She was a Deaf, not because she could not hear, but because, as her

scientists

A recent book contains biographies of some outstanding scientists. The author trips over himself in his eagerness to assure us that his subjects are "very approachable human beings as well as trained and often highly creative people."

But do we want our scientists to waste their time in approachability? Do we really care that they have wholesome hobbies and the usual number of healthy children? Are they not worth more to us if they're as crusty as Newton, as odd as Pascal, as remote as Willard Gibbs? Shouldn't they be left alone so that they can do their work instead of being compelled to placate us with the cosy stuff? I am not convinced that the common run of us really prefer geniality to genius.

CLIFTON FADIMAN

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teacher told her, "Hearing, you hear not." And that was it. A different kind of teacher, different duties, different children. There weren't that many Deafs, but there was enough for a class. They learned from the best teachers Tew could provide. But they learned no music.

The Songhouse takes care of all its children, she thought often, sometimes gratefully, sometimes bitterly. I am taken care of. Taught to work by being given duties in the Songhouse. Taught science and history and languages and I'm damned good at it. Outside, outside they would consider me gifted. But here I'm a Deaf. And the sooner I leave the better.

She would leave soon. She was fourteen. Only a few months left. At fifteen she would be out, with a comfortable stipend and the doors to a dozen universities open to her. The money would continue until she was twenty-two. Later, if she needed. The Songhouse took care of its children.

But there were still those few months, and her duties were interesting enough. She worked with security, checking the warning and protective devices that made sure the Songhouse stayed isolated from the rest of Tew. Such devices had not always been needed, in the old days. There had even been a time when the Songmaster in the High Room ruled all the world. But it was still less than a century since the outsiders had tried to storm the Songhouse in a silly dispute over a pirate who wanted the Songhouse's reputed great wealth. And now the security devices, which took a year to patrol. The duty had taken her around the perimeter, a journey longer than circling the Earth, and all by skooter, so that she was alone in the forests and deserts and seacoasts of the Songhouse lands.

Today she was checking the monitoring devices in the Songhouse itself. In a way it made her feel superior, to know what none of the children and few of the masters and teachers knew—that the stone was not impenetrable, that, in fact, it was heavily strung with wires and tubes, so that what seemed to be a rambling, primitive stone relic was potentially as modern as anything on Tew. Possession of the wiring diagrams gave her information that would surprise any of the less-informed singers. Yet whenever she dwelt on her pride at having inside knowledge, she forced herself to remember that she was only allowed the knowledge so young because she was completely outside all the discipline and study of the Songhouse. She was a Deaf—she could know secrets because she would never sing and so she didn't matter.

That was her frame of mind when she entered the High Room. She knocked brusquely because she was feeling upset. No answer. Good, the old Songmaster, Nniv, wasn't in. She pushed open the door. The High Room was freezing, with all the shutters open to the wintry wind. It was insane to leave the place like this—who could work here? Instead of going to the panels where the monitors were hidden, she went to the shutters of the nearest window, leaned out to catch them, and found herself looking down

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forever, it seemed, to the next roof below her. She hadn't realized how high she really was. On the east side, of course, the Songhouse was higher, so the stairs up to the High Room were not so terribly long. But she was high, and the height fascinated her. What would it be like to fall? Would she feel it like flying, with the exhilaration of the skooter rushing down a hillside? Or would she really be afraid?

She stopped herself with one leg over the sill, her arms poised to thrust her out. What am I doing? The shock of realization was almost enough to throw her forward, out the window. She caught herself, gripped the sides of the window, forced herself to slowly pull her leg back inside, withdraw from the window, and finally kneel, leaning her head against the lip of rock at the base of the window. Why did I do that? What was I doing?

I was leaving the Songhouse.

The thought made her shudder. Not that way. I will not leave the Songhouse that way. Leaving the Songhouse will not be the end of my life.

She did not believe it. And, not believing, she gripped the stone and wanted not to ever let go.

The room was cold. It made her numb, motionless as she was, and the whine of the wind through the spaces in the roof and the rush of wind through the windows made her afraid in a new way; as if someone were watching her.

She turned. There was no one. Just the bundles of clothing and books and stone benches and a foot sticking out from under one of the bunches of clothing and the foot was blue and she went over to it and discovered that this bundle of clothing was the misshapen, incredibly thin body of Nniv, who was dead, frozen in the wind from the winter outside. His eyes were open, and he stared at the stone in front of his face. Kya-Kya whimpered, but then reached down and pulled on his lip, as if to wake him. He rolled onto his back, but an arm stuck up in the air, and the legs moved only a little, and she knew he was dead, that the entire time she had been in the room he had been dead.

The Songmaster in the High Room died only rarely. She had never known another. It was Nniv who had ultimately decided her fate. He had declared her Deaf and decided she would leave the Songhouse without songs. She had hated him in her heart, though she had only talked to him a few times, ever since she was eight. But now she only felt repulsed by the corpse, and more than that, disgusted at the way he had died. Was the room always kept this bitterly cold? How had he lived so long! Was this some part of the discipline, that the ruler of the Songhouse lived in such squalor and misery?

If this emaciated, frozen corpse was the pinnacle of what the Songhouse could produce, Kya-Kya was not impressed. The lips were parted and the tongue lolled forward, blue and ghastly. This tongue, she thought, was once part of a song. Reputed to be the most masterful song in the galaxy, perhaps in the universe. But what had the song been, if not the throat and lips and teeth and lungs, all now cold; if not the brain,

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that now was still?

She could not sing because of lips and teeth and throat and lungs and because in her own mind she was not so single-minded that she could be what the Songhouse demanded. But did it matter?

She did not feel triumphant that Nniv was dead. She was old enough to know that she, too, would be dead, and if she had a century ahead of her it only meant time in which she might end up just as accidentally cruel as Nniv had been. Kya-Kya did not pretend to unusual virtue. Just unusual value, which no one but her recognized. And it occurred to her that Nniv's failure to recognize who and what she was (or had he, indeed recognized it?) did not *change* her.

She left him, went downstairs to find the Blind in charge of maintenance, an old man named Hrrai who rarely left his office. "Nniv is dead," she told him wondering if her happiness sounded in her voice (but knowing that Hrrai would not be likely to read her very well, being a Blind). Can't let anyone hear that I'm happy, she thought. Because I'm not rejoicing at his death. Only at my life.

"Dead?" Imperturbable Hrrai only sounded mildly surprised. "Well, then, you must go tell his successor."

Hrrai leaned down over his table and began worrying his pen back and forth across a page.

"But Hrrai," Kya-Kya said.

"But what?"

"Who is Nniv's successor?"

"The next Songmaster of the High Room," he said. "Of course."

"Of course nothing! How should I know who that is? How am I supposed to figure it out if you don't tell me?"

Hrrai looked up, more surprised this time than he had been at the news of Nniv's death. "Don't you know how this works?"

"How should I? I'm a Deaf. I never got past Groan!"

"Well, you needn't act so upset about it. It isn't exactly a secret, you know. Whoever finds the body will know, that's all. Whoever finds that the Songmaster in the High Room is dead will know."

"How will I know?"

"It will be obvious to you. Just go and tell him or her that he or she is supposed to take care of funeral arrangements. It's all that simple. But you really ought to act quickly. The Songhouse shouldn't be long without someone in the High Room."

He turned back to his work with a finality that told Kya-Kya she must leave, must be about her business, certainly must not bother him anymore. She left. And wandered the halls. She had thought to be quit of the Songhouse in a matter of months, the least important person ever to have been there, and suddenly she was supposed to choose the leader of the place. What kind of crazy system is this? she thought. And what the hell kind of rotten luck for me, of all people!

But it was not rotten luck, and as she wandered through the stone corridors, all of them chilly with the winter outside, she realized that no one ever came to the High Room un-

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bidden except maintenance people, and all the maintenance people were Deafs or Blinds, those who had not made it into the highest reaches of the singing folk. They could not sing, they could not teach—and so it was left to one of them to stumble across the body and, being impartial, not a member of the eligible group, choose fairly the person who obviously should be the Songmaster in the High Room.

Who?

She went to the Common Rooms and saw the teachers moving among the classes and knew that she could not suddenly elevate a teacher above his rank—it was tempting to be whimsical, to take vengeance on the Songhouse by naming an incompetent to head it, but it would be cruel to the incompetent so called, and she couldn't destroy someone that way. She knew enough to know that it was just as cruel to lift someone above where he ought to be as it was to force them to stay below their true station. I won't cause misery.

But the Songmasters, the logical group to choose from—she knew none of them, except by reputation. Onn, a gifted teacher and singer, but always assigned as a consultant to everybody because he couldn't live with the necessity of keeping a fixed schedule, meeting with obnoxious people, and making, of all things, decisions. Much better to give advice. No, Onn was not the one anyone would expect, though he was by far the nicest. And Chuffyun was too old, far too old. He would not be long behind Nniv.

In fact, just as Hrrai had told her, the choice was obvious. But not one she enjoyed, not at all. Esste, who was cold to everyone except for the little boy she was promoting as a possibility for Mikal's Songbird. Esste, who had reached down into the Common Rooms and lowered herself to be a teacher when she had been administrator of half the Songhouse, all for the sake of a little boy. No one made such great sacrifices for me, Kya-Kya thought bitterly. But Esste was a great singer, one who could light fires in every heart in the Songhouse—or quench those fires, if she wanted to. And Esste was above the petty jealousies and competitions that were endemic to the Songhouse. Esste was above such things in her attitude—and now she would be above them in station, too.

Kya-Kya stopped a master (who was quite surprised at having a Deaf interrupt her) and asked where she might find Esste.

"With Ansset. With the boy."

"And where is he?"

"In his stall."

Stall. The boy had been promoted. He couldn't be more than six yet, and he was already in Stalls and Chambers. It turned Kya-Kya's mouth down, her stomach dull. But in a moment she brightened again. The boy had been advanced by Esste, that's all. He would be in the Songhouse all his life, except for a few years as a performer. While she would

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be free, could see all of Tew—more, could see other planets, could go, perhaps, to Earth where Mikal ruled the universe in indescribable glory!

A few questions. A few directions. She found Ansset's stall, identical to all the others except for a number on the door. Inside she could hear singing. It was conversation—she knew when it was songtalk. Esste was inside, then. Kya-Kya knocked.

"Who?" came the answer—from the boy, not from the Songmaster.

"Kya-Kya. With a message for Songmaster Esste."

The door opened. The boy, who was far smaller than Kya-Kya, let her in. Esste sat on the stool by the window. The room was bleak—bare wooden walls on three sides, a cot, a stool, a table, and the stone wall framing the single window that opened onto the courtyard. Every stall was interchangeable with any other. But Kya-Kya would once have given her soul to have a stall and all that it implied. The boy was six.

"Your message?"

Esste was as cold as ever; her robe swirled around her feet as she sat absolutely erect on the stool.

"Esste, I have come from the High Room."

"He wants me?"

"He is dead." Esste's face betrayed nothing. She had Control. "He is dead," Kya-Kya said again. "And I hope you will take care of the funeral arrangements."

Esste sat in silence for a moment before she answered.

"You found the body?"

"Yes."

"You have done me no kindness," Esste said. She rose and left the room.

What now? Kya-Kya wondered, as she stood near the door of Ansset's stall. She had not thought beyond informing Esste. She had expected some reaction; expected at least to be told what to do. Instead she stood here in the stall with the boy who was the opposite of her, the epitome of success where she had met nothing but failure.

He looked at her inquiringly. "What does this mean?"

"It means," said Kya-Kya, "that Esste is Songmaster in the High Room."

The boy showed no sign of response. Control, thought Kya-Kya. That damnable Control.

"Doesn't it mean anything to you?" she demanded.

"What should it mean?" Ansset asked, and his voice was a web of innocence.

"It should mean a little gloating, at least, boy," Kya-Kya answered, with the contempt the hopelessly inferior can freely use when the superior is helpless. "Esste's been pampering you every step of the way. Leading you up without having to go through the pain everyone goes through. And now she has all the power it takes. You'll be a Songbird, little boy. You'll sing for the greatest people in the galaxy. And then you'll come home, and your Esste will see to it you never have to bother with being a friend or a tutor, you'll just step right into

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teaching, or being a master, or perhaps—why not?—a high master right from the start, and before you're twenty you'll be a Songmaster. So why don't you forget your Control and let it show? This is the best thing that's ever happened to you!" Her voice was bitter and angry, with no hint of music in it, not even the dark music of rage.

Ansset regarded her placidly, then opened his mouth, not to speak but to sing. At first she decided to leave immediately; soon she was incapable of deciding anything.

Kya-Kya had heard many singers before, but no one had sung to her like this. There were words, but she did not hear words. Instead she heard kindness and understanding, and encouragement. In Ansset's song she was not a failure. She was, in fact, a wise woman who had done a great favor for the Songhouse, who had earned the love of all future generations. She felt proud. She felt that the Songhouse would send her out, not in shame, but as an emissary to the worlds outside. I will tell them of the music, she thought, and because of me the Songhouse will be held in even greater esteem by everyone who knows of it. For I am as much a product of the Songhouse as any singer or Songbird. She was bursting with joy, with pride. She had not been so happy in years. In her life. She embraced the boy and wept for several minutes.

If this is what Ansset can do, he is worth all the praise he has been given, she thought. Why, the boy is full of love, even for me. Even for me. And she looked up into his eyes and saw—

Nothing.

He regarded her as placidly as he had before. Control. He had let out the song, and that was all. There was nothing human about him when he wasn't singing. He knew what she wanted to hear, he had given it to her, and that was all he needed to do.

"Do they wind you up?" she said to the blank face.

"Wind me up?"

"You may be a singer," she said angrily, "but you aren't human!"

He began to sing again, the tones already soothing, but Kya-Kya leaped to her feet, backed away. "Not again! You can't trick me again! Sing to the stones and make them cry, but I won't have you fooling me again!" She fled the room, slamming shut the door on his song, on his empty face. The child was a monster, not real at all, and she hated him.

She also remembered his song and loved him and longed to return to his stall to hear him sing forever.

That very day she pleaded with Esste to let her go early. To let her leave before she ever had to hear Ansset sing again. Esste looked confused, asked for explanation. Kya-Kya only insisted again that if she wasn't allowed to go, she would kill herself.

"You can go tomorrow, then," the new Songmaster in the High Room said.

"Before the funeral?"

"Why before the funeral?"

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"Because he'll sing then, won't he?"

Esste nodded. "His song will be beautiful."

"I know," Kya-Kya said, and her eyes filled with tears at the memory. "But it won't be a human being singing it. Good-bye."

"We'll miss you," Esste said softly, and the words were tender.

Kya-Kya had been leaving, but she turned to look Esste in the eye. "Oh, you sound so sweet. I can see where Ansset learned it. A machine teaching a machine."

"You misunderstand," said Esste. "It is pain teaching pain. What else do you think the Control is for?"

But Kya-Kya was gone. She saw neither Esste nor Ansset again before the tram took her and her luggage and her first month's money away from the Songhouse. "I'm free," she said softly when she passed the gate leading to Tew and the farms opened before her.

You're a liar, you're a liar, answered the rhythm of the engines.

7

A machine teaching a machine. The words left a sour memory that stayed with Esste through all the funeral arrangements. A machine. Well, true enough in a way, and completely untrue in another. The machines were the people who had no Control, whose voice spoke all their secrets and none of their intentions. But I am in control of myself, which no machine can ever be.

But she also understood what Kya-Kya meant. Indeed, she already knew it, and it frightened her how completely Ansset had learned Control, and how young. She watched him as he sang at Nniv's funeral. He was not the only singer, but he was the youngest, and the honor was tremendous, almost unprecedented. There was a stir when he stepped up to sing. But when he was through singing, no one had any doubt that the honor was deserved. Only the new ones, the Groans, and a few of the Bells were crying—it would not be right at a Songmaster's funeral to try to get anyone to break Control. But the song was grief and love and longing together, the respect of all those present, not just for Nniv, who was dead, but for the Songhouse, which he had helped keep alive. Oh, Ansset, you're a master, thought Esste, but she also noticed things that most did not notice. How his face was impassive before and after he sang; how he stood rigidly, his body focused on making the exact tone. He manipulates us, Esste thought, manipulates us but not half so perfectly as he manipulates himself. She noticed how he sensed every stir, every glance in the audience and fed upon it and gave it back a hundred fold. He is a magnifying mirror, Esste thought. You are a magnifying mirror who takes the love you've been given and spews it out stronger than before, but with none of yourself attached to it. You are not whole.

He came to where Esste sat, and sat beside her. It was his right, since she was his master. She said no words, but

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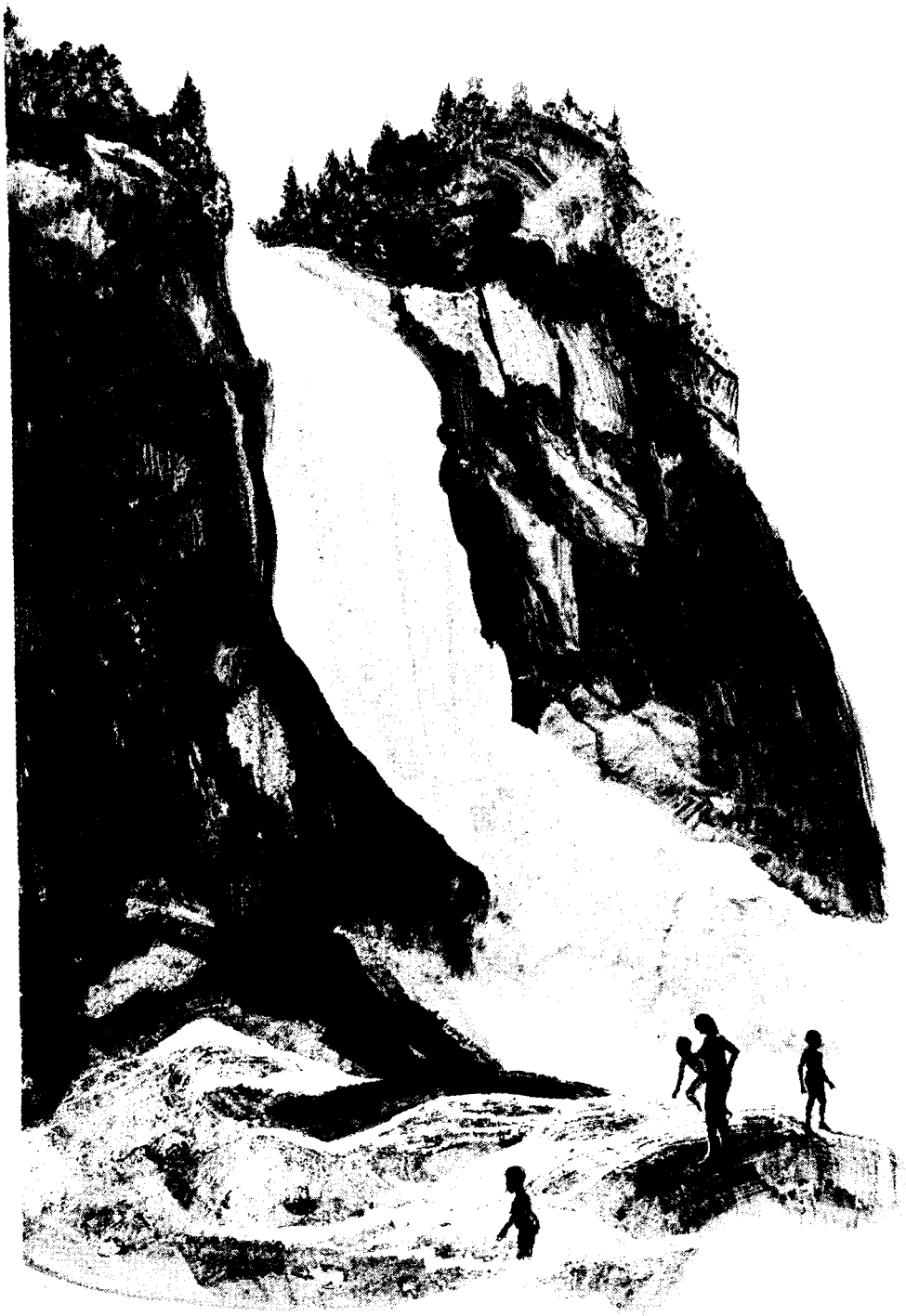

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only sighed in a way that said to Ansset's sensitive ears, "Fair, but flawed." The unexpected and undeserved criticism did not cause his expression to change. He only answered with a grunt that meant, "You hardly needed to tell *me*. I knew it."

Control, thought Esste. You have certainly learned Control.

8

Ansset did not sing again for an audience in the Songhouse. At first he did not notice it. It was simply not his turn to solo or duo or trio or quarto in Chamber. But when everyone in his chamber had performed twice or three times, and Ansset had not been asked to sing, he became puzzled, then alarmed. He did not ask because volunteering simply was not done. He waited. And waited. And his turn never seemed to come.

It was not long after he noticed it that the others in Chamber began commenting on it, first to each other, finally to Ansset. "Did you do something wrong?" they asked him, one by one at mealtime or in the corridors or in the toilet. "Why are you being punished?"

Ansset only answered with a shrug or a sound that said, How should I know? But when his ban from performing continued, he began to turn away the questions with coldness that taught the questioner quickly that the subject was forbidden. It was part of Control for Ansset, not to let himself become part of speculation about his mysterious ban. Nor would his Control allow him to ask. Esste could continue as long as she liked. Whatever it meant, whatever she hoped to accomplish, Ansset would bear it unquestioning.

She came to his stall every day, of course, just as before. Being Songmaster in the High Room meant additional duties, not relief from her previous ones. Finding and training Mikal's Songbird was her life's work, chosen freely decades ago. It would not end, the burden would not be lifted, just because Nniv died and that damned fool Kya-Kya had had the temerity to afflict her with his office. She said as much to Ansset, hoping to reassure him that he would not be losing her. But he took the news without any sign that he cared either way, and went on with the day's lessons as if nothing were wrong.

And why should he do anything else? Until Kya-Kya had said her say just before leaving, Esste had not worried particularly. If Ansset was superb at Control, he was superb at everything else, too, and so it was not to be remarked upon. But now Esste noticed the Control as if each example of Ansset's apparent unconcern were a blow to her.

As for Ansset, he had no idea what was going on inside Esste's mind. For Esste's Control was also superb, and she showed nothing of her worry or reasoning to Ansset. That was as it should be, Ansset assumed. I am a lake, he thought, and all my walls are high. I have no low place. I grow deeper every day.

It did not occur to him that he might

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drown.

9

A lesson.

Esste took Ansset to a bare room with no windows. Just stone, a dozen meters square, and a thick door that admitted no sound. They sat on the stone floor, and because all the floors were stone they found the floor comfortable, or at least familiar, and Ansset was able to relax.

"Sing," said Esste, and Ansset sang. As always, his body was rigid and his face showed no emotion; as always, the song was intensely emotional. This time he sang of darkness and closed-in spaces, and he sounded mournful. Esste was often surprised by the depth of Ansset's understanding of things he surely, at his age, could not know firsthand.

The song resonated and echoed back from the walls.

"It rings," Esste said.

"Mmmm," Ansset answered.

"Sing so it doesn't ring."

Ansset sang again, this time a wordless and essentially meaningless song that danced easily through his lowest notes (which were not very low) and came out more as air than as tone. The song did not echo.

"Sing," Esste said, "so that it is as loud to me, here by the wall, as it is right next to you, but so that none of it echoes."

"I can't," Ansset said.

"You can."

"Can you?"

Esste sang, and the song filled the room but there was no echo.

And so Ansset sang. For an hour, for another hour, trying to find the exact voice for that room. Finally, at the end of the second hour, he did it.

"Do it again."

He did it again. And then asked, "Why?"

"You do not sing only into silence. You also sing into space. You must sing exactly for the space you have been given. You must fill it so that no one can fail to hear you, and yet keep your tone so clear and free of echo that all they can hear is exactly what your body produces."

"I have to do this every time?"

"In a while, Ansset, it becomes reflex."

They sat in silence for a moment. And then, softly, Ansset asked, "I would like to try to fill the chamber this way."

Esste knew what he was asking, and refused to answer his real question. "I believe the chamber's empty right now. We could go there."

Ansset struggled with himself for a moment—Esste assumed, anyway, for though he was silent for a time, his face showed nothing. "Mother Esste," he finally said, "I don't know why I've been banned."

"Have you been?"

Mildly: "You know I have."

It was a minor victory. She had actually forced him to ask. Yet the victory was an empty one. He had not lost Control; he simply had found it unproductive to remain silent about it. Esste leaned back on the stone wall, not realizing that she herself was

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bending to his rigidity by relaxing her own.

"Ansset, what is your song?"

He looked at her blankly. Waited. Apparently he did not understand.

"Ansset, you keep singing our songs back to us. You keep taking what people feel and intensifying it and shattering us with it, but child, what song is yours?"

"All."

"None. So far I have never heard you sing a song that I knew was only Ansset."

He did not lose Control. Surely he should be angry. But he only looked at her with empty eyes and said, "You are mistaken." The child was six, and said *you are mistaken.*

"You will not sing before an audience again until you have sung for me a song that is yours."

"How will *you* know?"

"I don't know, Ansset. But I'll know."

He continued to regard her steadily, and she, because of her own Control, did not break her gaze. Some children had taken to Control very badly before, and usually they ended up as Deafs. Control was not easy for anyone, but essential for the songs. Yet here was a child who, like most really good singers and Songbirds, had learned Control quickly, lived with it naturally. *Too* naturally. The object of Control was not to remove the singer from all human contact, but to keep that contact clear and clean. Instead of a channel, Ansset was using Control as an impenetrable, insurmountable wall.

I will get over your walls, Ansset, she promised him silently. You will sing a song of yourself to me.

But his blank, meaningless face said only, You will fail.

10

Riktors Ashen was angry when he got to the High Room. "Listen, lady, do you know what this is?"

"No," Esste answered, and her voice was calculated to soothe him.

"It's a warrant of entry. From the emperor."

"And you've entered. Why are you upset?"

"*I've* entered after four *days!* I'm the emperor's personal envoy, on a very important errand—"

"Riktors Ashen," Esste interrupted (but quietly, calmly), "you are on an important errand, but this is not it. This is just a stop along the way—"

"Damn right," Riktors said, "and this petty errand has put me four days behind schedule."

"Perhaps, Riktors Ashen, you ought to have *asked* to see me."

"I don't have to ask. I have the emperor's warrant of entry."

"Even the emperor asks before he enters here."

"I doubt that."

"It's history, my friend. I myself brought him to this room."

Riktors was less agitated now. Was, in fact, embarrassed at his outburst. Not that he hadn't the right—this was a man, Esste knew, who could use rage to good effect. He hadn't risen to high rank in the fleet without reason.

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He was embarrassed because the rage had been real, and over a matter of pride. This was a young man who was learning. Esste liked him. Even though he was also a young man who would kill anyone to get what he wanted. Death waited in his calm hands, behind his boyish face.

"History is shit," Riktors said mildly. "I'm here to find out about Mikal's Songbird."

"The emperor has no Songbird."

"That," said Riktors, not without amusement, "is precisely the problem. Do you realize how many years have passed since you promised him a Songbird? Mikal is 118 years old this year. Naturally it's polite to suppose the emperor will live forever, but Mikal himself told me to tell you that he is aware of his mortality, and he hopes he will not die without having heard his Songbird sing."

"You understand that Songbirds are matched very carefully to their hosts. Usually we *have* the Songbird and work to place him or her properly. This was an unusual case, and until now we haven't had the right Songbird."

"Until now?"

"I believe we have the Songbird who will be Mikal's."

"I will see him now."

Esste chose to smile. Riktors Ashen smiled back. "With your permission, of course," he added.

"The child is only six years old," Esste answered. "His training is far from complete."

"I want to see him to know that he exists." Riktors held her gaze.

"I'll take you to him."

They wound their way down the stairs, through passages and corridors. "There are so many corridors," Riktors said, "that I don't see how you have any space left for rooms." Esste said nothing until they reached the corridors of stalls, where she paused for a moment and sang a long high note. Doors closed in the distance. Then she led the emperor's personal envoy to Ansset's door, and sang a few wordless notes outside.

The door opened, and Riktors Ashen gasped. Ansset was thin, but his light complexion and blond hair were given a feeling of translucence by the sun coming in his window. And the boy's features were beautiful, not just regular; the kind of face that melted men's hearts as readily as women's. More readily.

"Was he chosen for his voice, or his face?" Riktors Ashen asked.

"When a child is three," answered Esste, "his future face is still a mystery. His voice unfolds more easily. Ansset, I have brought this man to hear you sing."

Ansset looked blankly at Esste, as if he did not understand but refused to ask for explanation. Esste knew immediately what Ansset planned. Riktors did not. "She means for you to sing for me," he said helpfully.

"The child needs no repetition. He heard my request, and chooses not to sing."

Ansset's face showed nothing.

"Is he deaf?" asked Riktors.

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"We will go now," answered Esste. They went. But Riktors lingered until the last possible moment, looking at at Ansset's face.

"Beautiful," Riktors said, again and again, as they walked through more passageways toward the gatehouse.

"He is to be the emperor's Songbird, Riktors Ashen, not the emperor's catamite."

"Mikal has a large number of offspring. His tastes are not so eclectic as to include little boys. Why wouldn't the boy sing?"

"Because he chose not to."

"Is he always so stubborn?"

"Often."

"Hypnotherapy would take care of that. A good practitioner could lay a mental block that would forbid resistance—"

Esste sang a melody that stopped Riktors cold. He looked at her, not understanding why suddenly he was afraid of this woman.

"Riktors Ashen, I do not tell you how to move your fleets of starships between planets."

"Of course. Just a suggestion—"

"You live in a world where all you expect of people is compliance, and so your hypnotherapists and your mental blocks accomplish all your ends. But here in the Songhouse, we create beauty. You cannot force a child to find his voice."

Riktors Ashen had regained his composure. "You're good at that. I have to work a little harder to force people to listen to me."

Esste opened the door to the gatehouse.

"Songmaster Esste," Riktors said, "I will tell the emperor that I have seen his Songbird, and that the child is beautiful. But when will I tell him the child will be sent?"

"The child will be sent when I am ready," Esste replied.

"Perhaps it would be better if the child were sent when *he* was ready."

"When *I* am ready," Esste said again, and her voice was all pleasure and grace.

"The emperor will have his Songbird before he dies."

Esste hissed softly, which forced Riktors to come closer, to bring his face near enough that only he could hear what Esste said next:

"There is much for *both* of us to do before Mikal Imperator dies, isn't there?"

Riktors Ashen left quickly then, to finish his business for the emperor.

11

Brew takes your mind,
Bay takes your life,
Bog takes your money,
Wood takes your wife.
Stivess is cold,
Water is hot
Overlook wants you,
Norumm does not.

"What song is that?" asked Ansset.

"Consider it a directory. It used to be taught to the children of Step, to make fun of the other great cities of Tew. Step is no longer a great city. But the ones they made fun of still are."

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"Where will we go?"

"You are eight years old, Ansset," Esste answered. "Do you remember any life, any people outside the Songhouse?"

"No."

"After this, you will."

"What does the song mean?" asked Ansset. The flesket stopped then, at the changing place, where Songhouse vehicles always stopped and commercial transport took over. Esste led Ansset by the hand, ignoring his question for the moment. There was business at the ticket counter, and their luggage, slight as it was, had to be searched and itemized and fed into the computer, so that no false insurance claims could be made. Esste knew from her memories of her first venture outside the Songhouse lands that Ansset understood almost nothing of what was going on. She tried explaining a few things to him, and he seemed to pick it up well enough to get along. The money, and the idea of money, he took in stride. The clothing he found uncomfortable; he kept taking the shoes off until she insisted that they were essential. She did not look forward to his getting accustomed to the food. There would be diarrhea for days—at the Songhouse he had never acquired a taste or a tolerance for sugar.

She was not surprised at his quiet acceptance of everything. The trip meant that he was within a year of placement, yet he showed no excitement or even interest in his ultimate destination. Over the last two years he had finally begun to show a little human emotion in his face, but Esste, who knew him better than any other, was not fooled. The emotion was placed there in order to avoid exciting comment. None of it was real. It was nothing more or less than what was expected and proper at the moment. And Esste despaired. There were paths and hidden places that she herself had put in Ansset's mind, but now she could not reach him at all. She could not get him to speak of himself; she could not get him to show even the slightest inadvertent emotion; and as for the closeness they had felt on the hill overlooking the lake, he never betrayed a memory of it but at the same time never allowed her to get even a few steps into the path she could follow to put him into a light trance, where she might have accomplished or at least discovered something.

When the business at the changing place was finished, they sat to wait for the bus, a flesket that anyone with the money could ride. It was then that Esste whiled away the time by answering Ansset's question. If he was surprised or gratified that she remembered it, he did not show any sign.

"Brew is one of the Cities of the Sea—Homefall, Chop, Brine, and Brew—all of which are famous for beer and ale. They also have a reputation for exporting very little of their product because they are such prodigious drinkers. Beer and ale contain alcohol. They are enemies of Control, and you cannot sing when you've been

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drinking them."

"Bay takes your life?" Ansset prompted, having memorized the song, as usual.

"Bay used to have the unfortunate habit of holding public executions every Saturday whether anyone was sentenced to death or not. To avoid using up too many of their own citizens, they used strangers. The practice has in recent years, been stopped. Wood had a sort of mandatory wife-market. Very odd things. Tew is a very odd planet. Which is why the Songhouse was able to exist here. We were more normal than most cities, and so we were left alone."

"Cities?"

"The Songhouse began as a city. It began as a town of people who loved to sing. That's all. Things then grew from there."

"The rest of the cities?"

"Stivess is very far to the north. Water is just as far to the south. Overlook is a place whose only product is the beauty of its scenery, and it lives off the people of wealth who go there to end their days. Norumm has four million people. It used to have nine million. But they still feel crowded and refuse to let more than a few people visit them every year."

"Are we going there?"

"We are not."

"Bog takes your money. What does that mean?"

"You'll find out for yourself. That's where we're going."

The bus arrived, they boarded, and the bus left. For the first time in memory, Ansset saw people outside the milieu of the Songhouse. There were not very many people on the bus. Though this was the main highway from Seawatch to Bog, most people took the expresses, which didn't stop at the Songhouse changing place—or even at Step, usually. This bus was not an express—it stopped everywhere.

Directly in front of them were a mother and father and their son, who must have been at least a year older than Ansset. The child had been riding far too long, and he could not hold still.

"Mother, I need to go to the toilet."

"You just went. Stay in your seat."

But the child whirled around and knelt on the bench to stare at Esste and Ansset. Ansset looked at the boy, his gaze never wavering. The boy stared back, while wagging his backside impatiently. He reached out to bat at Ansset's face. It might have been meant as a friendly gesture, but Ansset uttered a quick, harsh song that spun the boy around in his seat. When the mother took the boy to the bathroom at the back of the bus, the child looked at Ansset in terror and stayed as far from him as possible.

Esste was surprised at how frightened the child had become. True, the music had been a rebuke. But the child's reaction was far out of proportion to Ansset's song. In the Songhouse, anyone would have understood Ansset's song, but here the child should have understood it only vaguely—that was the purpose of the

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trip, to learn to adapt to outsiders. Yet somehow Ansset had communicated with the boy, and done it better than he had with Esste.

Could Ansset actually *direct* his music to one particular person? Esste wondered. That went beyond song-talk. No, no. It must have been just that the boy had been paying closer attention to Ansset than she had, so that the song struck him with more force.

And instead of worrying, she made the incident give her more confidence. In his first encounter with an outsider, Ansset had done far better than he should have been able to. Ansset was the right choice for Mikal's Songbird. If only.

Though the forest was not so lush as the deep woods in the Valley of Songs, where all Ansset's excursions had taken him before, the trees were still tall enough to be impressive, and the lack of underbrush made for a different kind of beauty, a sort of austere temple with trunks extending into the infinite distance and the leaves making a dense ceiling. Ansset watched the trees more than the people. Esste speculated as to what was going on in his impenetrable mind. Was he deliberately avoiding looking at the others? Perhaps he needed to avoid their strangeness until he could absorb it. Or was he truly disinterested, more drawn to the forest than to other human beings?

Perhaps I was wrong, Esste thought. Perhaps my intuition was a mistake, and I should have let Ansset perform. For two years he has had no audience but me. If his preferred treatment before kept the other children from being close to him, his ban had made him a pariah. No one knew what his error had been, but after that triumphant song at Nniv's funeral Ansset's voice had gone unheard, and everyone concluded the disgrace must be punishment for something terrible. Some had even sung of it in chamber. One child, Ller, had even had the temerity to protest, to sing angrily that it was unjust to ban Ansset for so long, so unfairly. Yet even Ller avoided Ansset as if the future Songbird's suffering were contagious.

If I was wrong, Esste concluded, the damage has been done. In a year Ansset will go to Mikal, ready or not. Ansset will go as the finest, most exquisite voice we have sent from the Songhouse in living memory. But he will go as an inhuman creature, unable to communicate the normal human feelings with others. A singing machine.

I have a year, Esste thought. I have one year to break down his walls without breaking his heart.

The forest gave way to wooded prairie, the desolate land where wild animals still roamed. Population pressure on Tew had never been great enough to drive many settlers to this plateau where winters were impossibly cold and summers unbearably hot. They were an hour reaching the Rim, a great cliff thousands of kilometers long and nearly a kilometer high. Here, however, the rift had split in

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two parts, and between them other cliffs took the descent more gradually. The city of Step had grown up at the foot of the jumble of rock, where river traffic had to end and transfer to roads. Few of the farmers could afford fleskets or the even more expensive flinks. Even when Step ceased to be a major city, it remained important locally.

The bus followed the switchback road carved centuries ago in the rock. It was rough, but the bus never felt it, except when sudden dips forced it to drop a bit in altitude. Ansset still watched the scenery, and now even Esste gazed at the huge expanse of farmland at the base of the descent. What fell as snow on the plateau came as rain below the Rim, and farmers here fed the world, as they liked to say.

Step itself was boring. All the buildings were old, and decay was the loudest message shouted by the shabby signs and the nearly empty streets. Nevertheless, lessons had to be learned. Esste took Ansset into a dismal restaurant and ordered and paid for a dinner. "Even the prices are depressed here," she commented. Ansset ignored her.

The restaurant was no more crowded than the streets. Wherever all the people were, it wasn't here. And the food came quickly. It was not bad, but the flavor had left it somewhere between the farm and the table. Ansset ate some, but not much. Esste ate less. Instead, she looked around at the people. At first she got the impression that they were all old, but because she didn't trust impressions she counted. Only six were grey-haired or balding—the other dozen were middle-aged or young. Some were silent, but most conversed. Yet the restaurant felt old, and the conversations sounded tired, and it all made Esste vaguely sad. The songs of the place were gone, if there had ever been songs. Now only moans were appropriate.

And, as soon as Esste thought that, she realized that Ansset was moaning. The sound was soft but penetrating, almost like the background noise of the kitchen machines that processed the food. Control allowed Esste to refrain from glancing at Ansset. Instead she listened to the song. It was a perfect echo of the mood of the place, a perfect understanding of the, not misery, but weariness of the people. But gradually Ansset built a rising tone into his melody, a strange, surprising element that made it interesting, or at least that made a person hearing it want to be interested in something. Esste knew immediately what Ansset was doing. He was breaking the ban. He was performing. And once again the song was not his own—it was what every person in the restaurant, including Esste, wished to hear, wished to be made to feel.

The lilting quality of his song became more pronounced. People who had not been conversing began to talk; conversations already in progress became more animated. People smiled. The ugly young woman at the counter began talking to the waiter. Even joking. No one seemed to notice

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Ansset's song, and its effect.

And Ansset faded, softened the song, let it die in midnote so that it seemed to continue into the silence. Esste was not sure, in fact, when the song was over, even though she was the only person who had been carefully listening to it. Yet the effect of the song lingered. Deliberately Esste waited, watched to see how long the people would remain cheerful. They left the restaurant smiling.

"I congratulate you," said Esste, "on your superb performance."

Ansset's face did not respond. His voice did. "They're harder to change than Songhouse people."

"Like trying to move through water, yes?" asked Esste.

"Or mud. But I can do it."

Not even smugness. Just a recognition of fact. But I know you, boy, Esste thought. You are enjoying yourself immensely. You are having a hilarious time outsmarting me and at the same time proving that you can handle any situation. As long as it's outside of you.

The bus took them through the night back up the Rim, but to the west this time, and it was still dark when they reached Bog. The sky was dark, that is. The lights of the city filled the land to the edge of the sea. It seemed in places that there were no breaks between the lights, as if the city were a carpet of pure light, a fragment of the sun. The clouds above the city glowed brightly. Even the sea seemed to shine.

The streets were so crowded, even in the last hours before dawn, that buses and fleskets and even skooters had to use overhead ramps that wound among the buildings. It was dazzling. It was exciting. The crush of humanity was frantic, desperate, exhilarating, even from the inside of a bus. Ansset slept through it, after waking for a moment when Esste tried to get him to look. "Lights," he said, in a tone of voice that said, I'd rather sleep.

"Might as well go upstairs and sleep," said the clerk at the hotel. "Nothing happens during the day here. Not even business. Can't even get a decent meal except at one of those junky all-day diners.

But after only a few hours of sleep, Ansset insisted that they go out.

"I want to see the city now."

"It looks better by electric light," Esste told him.

"So." So that's why I want to see it.

"So?" I'd rather rest.

"The beds here are too soft," Ansset said, "and my back is sore. The food we ate in Step has sent me to the toilet four times, and it looked better than it did on the table. I want to see outside. I want to see it when it isn't dressed up to fool people."

You are eight years old, Esste said silently. You might as well be a crusty old eighty.

They saw Bog by daylight.

"Name?" asked Ansset.

"The city is on the estuary of the River Salway. Most of the land is only a few centimeters above sea level, and it is constantly trying to sink into the sea." She showed him how architec-

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ture had adapted to the conditions. Every building had a main entrance opening onto air on every floor. As the building sank, the entrance on the next floor up came into use. There were buildings whose tops were only a few feet above street level—usually, other buildings had already been built atop them.

The lighted signs were off in the daytime, and very few people were on the streets. "As dismal as Step," Ansset said.

"Except that it comes alive at night."

"Does it?"

Litter was inches deep on the streets in some places. Sweepers sucked their way through the city, roaring as they chewed up the trash. The few people on the streets looked as if they had had a hard night—or were up after very little sleep. It had been a carnival the night before; today the city was a cemetery.

A park. They sat on a massit that contoured itself to fit their bodies within a few moments. An old woman sat not far off, dangling her feet in a pond. She was holding to a string that led off into the water. Beside her an ugly eel occasionally twitched. She was whistling.

Her melody was harsh, untuneful, repetitive. Ansset began singing the same tune, in the same pitch—high, wavering, uncertain. He matched her, waver for waver, sour note for sour note. And then, abruptly, he sang a dissonance that grated painfully. The old woman turned around, heaving her huge stomach off her lap as she did. She laughed, and her breasts heaved up and down. "You know the song?" she called.

"Know it!" cried Ansset. "I wrote it!"

She laughed again. Ansset laughed with her, but his laugh was a high imitation of hers, great gasps and little, loud bursts of sound. She loved hearing his laugh as much as her own—since it was her own. "Come here!" she called.

Ansset came to her, and Esste followed, unsure whether the old woman meant well for the boy. Unsure until she spoke again.

"New here," she said. "I can tell who's new here. This your mother? A beautiful boy. Don't let go of him tonight. He's pretty enough to be a catamite. Unless that's what you have in mind, in which case I hope you turn into an eel, speaking of which would you like to buy this one?"

The eel, as if to display its charms, twitched obscenely.

"It isn't dead yet," Ansset commented.

"They take hours to die. Which is fine with me. The longer they wiggle the more they pee and the better they taste. This pond's full of them. Connects right up with the sewer system. They live in the sewer. Along with worse things. Bog produces more turds than anything else, enough to keep a million of these things alive. And as long as they're around, I won't starve." She laughed again, and Ansset laughed with her, then briefly

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took her laugh and turned it into a mad song that made her laugh even harder. It took Control for Esste not to laugh with her.

"The boy's a singer."

"The boy has many gifts."

"Songhouse?" asked the woman.

Better to lie. "They wouldn't take him. I told them he had talent, genius even, but their damned tests wouldn't find a genius if he sang an aria."

"That's fine enough. Plenty of market for singers around here, and not the Songhouse type, you can bet. If he's willing to take off his clothes he can make a fortune."

"We're just visiting."

"Or there are even places where he could earn plenty by putting them on. All kinds here. But you *are* from out of town. Everybody knows you don't go into the parks in the daytime. Not enough police to patrol them. Even the monitors do no good—only a few men and women to watch them, and they're sleepy from the night before anyway. The night lives, but the daytime's a crime. It's a saying."

The singsong in her voice had said as much. But Ansset apparently couldn't resist. He took the words and sang them several times, each time funnier than the last. "The night lives, but the daytime's a crime."

She laughed. But her eyes got serious quickly. "It's all right here on the edge. And they never bother me. But you be careful."

Ansset picked up the eel, looked at it calmly. The eel's eyes looked desperate. Ansset asked, "How does it taste?"

"How else? All it eats is shit. It tastes like shit."

"And you eat it?"

"Spices, salt, sugar—I can take eel and make it taste like almost anything. Still terrible, but at least not eel. Eel's a flexible meat. You can bend it and twist it into whatever you want."

"Ah," said Ansset.

To the old woman, his *ah* meant nothing. To Esste, it said, I am an eel to you. It said, You can bend me, but I will strain against the bending.

"Let's go," said Esste.

"A good idea," said the old woman. "It isn't safe here."

"Good-bye," said Ansset. "I'm glad I met you." He sounded so glad to meet her that she was surprised, and smiled with more mirth as they left.

12

"This is boring," Ansset said. "There must be more to see than this."

Esste looked at him in surprise. When she had come here as an incipient Songbird, the shows with their dancing and singing and laughing were a marvelous surprise to her. She had not thought Ansset would be so easily satiated.

"Where should we go, then?"

"Behind."

"Behind what?"

"Everything." He got up from his seat and started sidling out between the rows. A woman reached out and patted his shoulder. He ignored her completely and moved on. Esste tried to catch up, but he fit better through

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the crowds in the aisles as people constantly came and went. She caught up with him where he waited by the exit where the waiters came and went with food and drinks for the people at tables down front.

"In here," he said.

"We're not allowed."

"Anyway."

He went in. Esste, having no choice, followed. Where was the fear and shyness of strangers that normally kept children from the Songhouse in line? Ansset would never show fear even if he felt it—but surely he felt some inhibition?

She found him with the cooks. They laughed and joked with him, and he echoed their laughs and their mood and made it happier as he talked virtual nonsense to them. They loved it. "Your son, lady?"

"My son."

"Good boy. Wonderful boy."

Ansset watched as they cooked. The heat in the kitchen was intense. The cook explained as he worked. "Most places use quick ovens. But here, we go for the old flavors. The old ways of cooking. It's our specialty." Sweat dripped from Ansset's chin; his hair stuck to his forehead and neck in sweaty curls. He seemed not to notice it, but Esste noticed, and said, in tones that meant she intended to be obeyed, "We're going."

Ansset offered no resistance, but when she started leading him to the door they had entered from he unerringly headed toward another exit. It led to a loading dock. Loaders looked at them curiously, but Ansset was humming a mindless tune and they left him alone.

Beyond the dock an indoor street serviced all the buildings of that area. It was a city within the city: all the fronts outside glittering for the visitors, the gamers, the funseekers, while behind the buildings, within the buildings the loaders, the cooks, the waiters, the servants, the managers, the entertainers passed back and forth, rode in shabby taxis, emptied garbage. It was the ugliness that all the pleasure of Bog generated, hidden from the paying customers behind walls and doors that said Employees Only.

Esste could barely keep up with Ansset. She made no pretense of directing him now. He had found this place, and it was his music that kept at bay those who might have stopped them. She had to stay with him; wanted to stay with him, for she was excited by the discoveries he made, much more excited than he let himself appear to be.

A garbage processing station; a whoreshop; an armored car loading that hour's receipts from a gambling establishment; a dentist who specialized in fixing the teeth of those who had to smile and didn't want to take more than an few minutes off work; a rehearsal for a slat show; and a thousand loaders bringing in food and taking out garbage.

And a morgue.

"You're not allowed in here," said the embalmer, but Ansset only smiled

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and said, "Yes we are," and sang unshakeable confidence. The embalmer shrugged and went on with his work. And soon he began talking as he went. "I clean 'em," he said. The bodies came in on a conveyor. He rolled them off onto a table, where he slit the abdomen and removed the guts. "Rich folks, poor folks, winners, losers, players, workers, they dies a hundred a night in this city, and here we cleans 'em pretty so they'll keep. All the guts is the same. All the stinks is the same. Naked as babies." The guts went into a bag. He filled the cavity with a stiff plastic wool and sewed up the skin with a hooked needle. It took only ten minutes for one body. "Another one does the eyes, and another one does visible wounds. I'm a specialist."

Esste wanted to leave. Pulled on Ansset's arm, but Ansset wouldn't go. He watched four bodies come by. The fourth one was the old woman from the park. The embalmer had just about run out of chat. He cut open the huge stomach. The stench was worse. "I hate the fat ones," said the embalmer. "Always having to hold the fat out of the way. Slows me down. Gets me behind." He had to reach over mounds of flesh to reach the bowels, and he swore when he broke them. "Fat ones makes me clumsy."

The woman's face was set in a grimace that might have been a grin. Her throat had been slit.

"Who killed her?" asked Ansset, his face and voice showing no emotion beyond curiosity.

"Anyone. How should I know? Just a deader. Could have been killed for anything. But she's a poor one, all right. I know the smell. Eats eels. If the killers hadn't got her the cancer would've. See?" He pulled up the stomach, which was distended and putrified by a huge tumor. "So fat she didn't know she had it. Would have finished her off soon enough."

It took the embalmer several tries and stronger thread before he could tie the abdomen back together again. In the meantime another body passed on the conveyor. "Damn" he said. "There'll be complaints tonight, that's for sure. Another missed quota. I hate the fat ones."

"Let's go *now,*" said Esste, deliberately letting her Control slip enough that he would be surprised into moving. He let her lead him to the indoor street.

"Enough," Esste said. "Let's go."

"She was wrong," Ansset answered.

"Who?"

"The woman. She was wrong. They wouldn't let her alone."

"Ansset."

"This has been a good trip," Ansset said. "I've learned a lot."

"Have you?"

"Pleasure is like making bread. A lot of hot, nasty work in the kitchen for a few swallows at the table."

"Very good." She tried to lead him away.

"No Esste. You can ban me at the Songhouse, but you can't ban me here." And he broke away from her and ran to the backstage entrance of a

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theater. Esste followed, but she was not young, and though she had made an effort to stay in shape a woman of her age could not hope to overtake a child determined to escape. She was lucky to stay close enough to see where he went.

An orchestra was playing to a full hall, and a woman on the stage was dancing nude. An equally naked man waited in the wings. Ansset stood behind one of the illusions, rigid as he sang. His voice was clear and loud, and the woman heard it and stopped dancing, and soon the members of the orchestra began hearing it and stopped playing. Ansset stepped through the illusion and walked out onto the stage, still singing.

Ansset sang to them what they had been feeling, what the orchestra had been pathetically incompetent to satisfy. He sang lust to them, though he had never experienced it, and they grew passionate and uncontrollable, audience and orchestra and the naked woman and man. Esste grieved inwardly as she watched it. He will give them everything they want.

But then he changed his song. Still without words, he began telling them of the sweating cooks in the kitchen, of the loaders, of the dentist, of the shabbiness behind the buildings. He made them understand the ache of weariness, the pain of serving the ungrateful. And at last he sang of the old woman, sang her laugh, sang her loneliness and her trust, and sang her death, the cold embalming on a shining table. It was agony, and the audience wept and screamed and fled the hall, those who could control themselves enough to stand.

Ansset's voice penetrated to the walls, but did not echo.

When the hall was empty, Esste walked onto the stage. Ansset looked at her with eyes as empty as the hall.

"You eat it," said Esste, "and you vomit it back fouler than before."

"I sang what was in me."

"In you? None of this ever got in you. It came to the walls and you threw it back."

Ansset's gaze did not swerve. "I knew you would not know it when I sang from myself."

"It was you that did not know," Esste said. "We're going home."

"I was to have a month."

"You don't need a month here. Nothing here will change you."

"Am I an eel?"

"Are you a stone?"

"I'm a child."

"It's time you remembered that."

He offered no resistance. She led him to the hotel, where they gathered their things and left Bog before morning. It all failed, Esste thought. I had thought that the mixture of humanity here would open him. But all he found was what he already had. Inhumanity. An impregnable wall. And proof that he can do to people whatever he wants.

He had read the audience of strangers too well. It was something that had never happened at the Songhouse before. Ansset was not just a brilliant singer. He could hear

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the songs in people's hearts without their having to sing; could hear them, could strengthen them, could sing them back with a vengeance. He had been forced into the mold of the Songhouse, but he was not made of such malleable stuff as the others. The mold could not fit.

What will break? Esste wondered. What will break first?

She did not for a moment believe it would be the Songhouse. Ansset, for all his seeming strength, was far more fragile than that. If he goes to Mikal like this, Esste realized, he will do the opposite of all my plans for him. Mikal is strong, perhaps strong enough to resist Ansset's perversion of his gift. But the others: Ansset would destroy them. Without meaning to, of course. They would come to drink again and again at his well, not knowing it was themselves they drank until they were dry.

He slept in the bus. Esste put her arms around him, held him, and sang the love song to him over and over in his sleep.

13

"I haven't time for this," Esste said, allowing her voice to sound irritated.

"Neither have I," Kya-Kya answered defiantly.

"The schools on Tew are excellent. Your stipend is more than adequate."

"I have been accepted at the Princeton Government Institute."

"It will cost ten times as much to support you on Earth. Not to mention the cost of getting you there. And the inconvenience of having to give it to you in a lump sum."

"You earn ten times that amount from a single year's payment on a Songbird."

True enough. Esste sighed inwardly. Too much today. I was not ready to face this girl. What Ansset has not taken from me, exhaustion has. "Why Earth?" she asked, knowing that Kya-Kya would recognize the question as the last gasp of resistance.

"Earth, because in my field I'm a Songbird. I know that's hard for you to admit, that someone can actually do something excellent that isn't singing, but—"

"You can go. We will pay."

The tone of voice was dismissal. The very abruptness and unconcern of it made her victory feel almost like a letdown. Kya-Kya waited for a few moments, then went to the door. Stopped. Turned around and asked, "When?"

"Tomorrow. Have the bursar see me."

Esste turned back to the papers on her table. Kya-Kya took advantage of her inattention to look around the High Room. I chose you for this place, Kya-Kya thought, trying to feel superior. It didn't work. It was as Hrrai had said—she made the obvious choice. Anyone who knew the Songhouse would have named Esste to the office.

The room was cold, but at least all the shutters were closed. There were drafts, but no wind. Apparently Esste did not intend to die soon. Kya-Kya

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looked at the window where she had almost fallen out. With the shutters closed it was just another window, or part of the wall. The room was not kilometers above the ground; it was as low as any other building; the Songhouse was just a building; she did not care whether she never saw it again, felt no lingering fondness for its stone, refused to dream of it, did not even demean herself by disparaging it to her friends at the university.

Her fingers brushed the stone walls as she left.

Esste looked up at the sound of Kya-Kya's leaving. Finally gone. She picked up the paper that concerned her far more than the needs of a Deaf who was trying to avenge her failure.

Songmaster Esste:

Mikal has called me to Earth to serve in his palace guard. He has also instructed me to bring his Songbird back with me. It is my understanding that the child is nine. I have no choice but to obey. I have arranged my route, however, so that Tew is my last stop. You have twenty-two days from the date of this message. I regret the abruptness of this, but I will carry out my orders.

Riktors Ashen.

The letter had been transmitted that morning. Twenty-two days. And the worst of it is, Ansset is ready. Ready. Ready.

I am not ready.

Twenty-two days. She pushed a button under the table. "Send Ansset to me."

14

Rruk had just entered Stalls and Chambers, right on schedule. She had no power in her voice, but she was a sweet singer, and pleased everyone who heard her. Still, she was afraid. Stalls and Chambers was a greater step than those between Groan and Bell or Bell and Breeze. Here she was one of the youngest, and in her chamber she *was* the youngest. Only one thing helped her forget her timidity—this was the seventh chamber. Ansset's chamber.

"Will Ansset come?" Rruk asked a boy sitting near her.

"Not today."

Rruk did not show her disappointment; she sang it.

"I know," said the boy. "But it hardly matters. He never sang here anyway."

Rruk had heard rumors of that, but hadn't believed them. Not let Ansset sing? But it was true. And she murmured a song of the injustice of Ansset's banning.

"Don't I know it," said the boy. "I once sang just such a song in chamber. My name's Ller."

"Rruk."

"I've heard of you. You're the one who first sang the love song to Ansset."

It was a bond—they both had given something, even dared something for Ansset. Chamber began then, and their conversation ceased. Ller was part of a trio that day. He took the high part, and did a thin high drone that changed only rarely. Yet it was

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still the controlling voice in the trio, the center to which the other two voices always returned. By subordinating his own virtuosity, he had made the song unusually good. Rruk liked him even more, for his own sake now, not just for Ansset's.

After chamber, without particularly deciding it, they went to Ansset's stall. "He was called to the Songmaster in the High Room just before chamber. Perhaps he'll be back now. Usually Esste comes to him as master, so it may be that she called him up there to lift the ban."

"I hope so," Rruk said.

They knocked at Ansset's door. It opened, and Ansset stood there regarding them absently.

"Ansset," Ller said, and then fell silent. Any other child they could have asked directly. But Ansset's long isolation, his unchildlike expression, his apparent lack of interest—they were difficult obstacles to surmount.

When the silence had lasted far too long, Rruk blurted. "We heard you went to the High Room."

"I did," Ansset said.

"Is the ban lifted?"

Ansset again looked at them in silence.

"Oh," said Rruk. "I'm sorry." Her voice told how sorry.

It was then that Ller noticed that Ansset's blankets were rolled together.

"Are you leaving?" Ller asked.

"Yes."

"Where?" Ller insisted.

Ansset went to the blanket, picked it up, and came back to the door. "The High Room," he said. Then he walked by them and headed down the corridor.

"To live there?" Ller asked.

Ansset did not answer.

15

"This was not a job for a seeker," the seeker said.

"I know," Esste answered, and she sang him an apology that pleaded the necessity of the work.

Mollified, the seeker made his report. "I spent the income from a decade of singers getting into the secret files of the child market. Doblay-me is a simple place to do business. If you have enough money and know whom to give it to, you can accomplish anything."

"You found?"

"Ansset was kidnapped. His parents are very much alive, would pay almost anything to get him back. And when he was taken, he was old enough to know his parents. To know they didn't want him to go. Stolen from them at a theater. The kidnapper I talked to is now a petty government official. Taxes or something. I had to hire some known killers in order to scare him into talking to me. Very unpleasant business. I haven't been able to sing in weeks."

"His parents?"

"Very rich. The mother a very loving woman. The father—his songs are more ambiguous. I'm not a great judge of adults, you know that. I haven't needed to be. But I had the feeling there were guilts in him that he

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was afraid of. Perhaps he could have done more to get Ansset back. Or perhaps the guilts are for other things entirely. Completely unrelated. According to the law, now that you and I know this, it's a capital offense not to give the boy back."

Esste looked at him, sang a few notes, and both of them laughed. "I know," the seeker said. "Once in the Songhouse, you have no parents, you have no family."

"The parents don't suspect?"

"To them their little boy is Byrwyn. I told them that the psychotic child in our hospital on Murrain had the wrong blood type to be their son."

A knock on the door.

"Who?"

"Ansset," came the answer.

"May I see him?" the seeker said.

"You may see him. But don't speak to him. And when you leave, bar the door from the other side. Tell the Blind that I'll be taking my meals through the machines. No one is to come up. Messages through the computer."

The seeker was puzzled. "Why the isolation?"

"I am preparing," Esste said, "Mikal's Songbird."

Then she arose and went to the door and opened it. Ansset came in, holding his blanket roll unconcernedly. He looked at the seeker without curiosity. The seeker looked at him, too, but not so unemotionally. Two years of tracing Ansset's past had given the boy unusual importance in the seeker's eyes. But as the seeker watched, and saw the emptiness of Ansset's face, he let himself show grief, and he sang his mourning to Esste, briefly. She had told him not to speak. But some things could not. Should not go unsaid.

The seeker left. The bar dropped into place on the other side of the door. Ansset and Esste were alone.

Ansset stood before Esste for a long time, waiting. But this time Esste had nothing to say. She simply looked at him, her face as blank as his, though because of age some expression was permanently inscribed there and she could not look as empty of personality as he. The wait seemed interminable to Esste. The boy's patience was greater than most adults'. But it broke, eventually. Still silent, Ansset went to the stone bench beside one of the locked shutters and sat down.

First victory.

Esste was able, now, to go to the table and work. Papers came from the computer; she wrote by hand notes to herself; wrote by keys messages into the computer. As she worked Ansset sat silently on the bench until his body grew tired and cold. Then he got up, walked around. He did not try the door or the shutters. It was as if he already grasped the fact that this was going to be a test of wills, a trial of strength between his Control and Esste's. The door and windows would be no escape. The only escape would be victory.

Outside it grew dark, and the light from the cracks in the shutters disappeared. There was only the light over

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the table, which almost no one ever saw in use—the illusion of primitiveness was maintained before everyone possible, and only the staff and the Songmasters knew that the High Room was not really so bare and simple as it seemed. The purpose of it was not really illusion, however. The Songmaster of the High Room was invariably someone who had grown up in the chilly stone halls and Common Rooms and Stalls and Chambers of the Songhouse. Sudden luxury would be no comfort; it would be a distraction. So the High Room seemed bare except when necessity required some modern convenience.

Ansset sat in the gloom in a corner of the High Room as Esste finally closed the table and laid out her own blankets on the floor. Her movement gave him permission to move. He spread out his own blankets in the far corner, wrapped himself in them, and was asleep before Esste.

The second day passed in complete silence, as did the third, Esste working most of the day at the computer, Ansset standing or walking or sitting as it pleased him, his Control never letting a sound pass his lips. They ate from the machine in silence, silently went to the toilet in a corner of the room, where their wastes were consumed by an incredibly expensive disturbor in the walls and floor.

Esste found it hard, however, to keep her mind on her work. She had never been so long without music in her life. Never been so long without singing. And in the last few years, she had never passed a day without Ansset's voice. It had become a vice, she knew—for while Ansset was banned from singing to others in the Songhouse, his voice was always singing in his stall, and they had conversed for hours many times. Her memory of those conversations, however, maintained her resolution. An intellect far beyond his years, a great perception of what went on in people's minds, but no hint of anything from his own heart. This must be done, she said. Only this can break his walls, she said to herself. And I must be strong enough to need him less than he needs me, in order to save him, she cried to herself silently.

Save him?

Only to send him to the capital of mankind, to the ruler of humanity. If he has not found a way to tap the deep wells of himself by then, Ansset will never escape. There his very closedness would be applauded, honored, adored. His career would be made, but when he came back to the Songhouse at the age of fifteen there would be nothing there. He would never be able to teach; only to sing. And he would be a Blind. That would kill him.

That would kill me.

And so Esste remained silent for three days, and on the fourth night she was wakened from her sleep by Ansset's voice. He was not awake. But the voice had to come out. In his sleep he was singing, meaningless, random ditties, half of them childish songs taught to new ones and Groans. But in his sleep his Control had broken, just

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a little. Esste noted this.

The fourth day began with complete silence again, as if the pattern could be repeated forever. But sometime during the day Ansset apparently reached a decision, and when the High Room was warmest in the afternoon he spoke.

"You must have a reason for your silence, but *I* don't have a reason for mine except that you're being silent. So if you were just trying to get me to stop being stubborn and talk, I'm talking."

The voice was perfectly controlled, the nuances suggesting a pro forma surrender, but no real recognition of defeat. A slight victory, but only a slight one. Esste showed no notice of the fact that Ansset had spoken. She was grateful, however, not so much because it was another step forward as because it meant she could hear Ansset's voice again. Ansset speaking with perfect Control was only slightly closer to her objective than Ansset silent with perfect Control.

When she did not answer, Ansset fell silent again, occasionally exercised as before, said nothing for several hours. But at nightfall, when Esste laid out her blanket and Ansset laid out his, he began to sing. Not in his sleep, this time. The songs were deliberately chosen, gentle melodies that pleased Esste very much. They made her feel confident that everything would work out fine, that her worries were meaningless, that Ansset would be fine. After a while, they even made her feel that Ansset was already fine, and she had been exaggerating her fears because of her concern for him in the frightening placement he would be facing.

She startled. Her Control gave no outward sign, but inwardly she was furious with herself. Ansset was using his voice on her, using his gift. He had sensed her mood of worry and her wish for peace and was playing on it, trying to put her off her guard.

I'm out of my class, she realized. I'm a Groan trying to sing a duet with a Songbird. How can my silence compare to his singing as a weapon in this battle?

He sang that night for hours, and she lay awake resisting him by concentrating on the problems and concerns of the Songhouse. The pressure from Stivess to open the northwest section, which the Songhouse almost never used, to oil exploration. The complaints by Wood that pirates were using the desert islands in the southwest as bases from which to pillage shipping in the gulf. The question of where to invest the incredible amount the emperor would pay each year to have a Songbird. The damage that would be done when Mikal the Terrible actually received a Songbird and the rest of mankind, to whom the Songhouse had seemed like the one inviolable institution left in the galaxy, lost faith and supposed that for money, or under pressure, even the Songhouse had lowered its standards.

All these thoughts were enough to occupy days and weeks under normal circumstances. But Ansset's songs

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played around the edges and while she was no longer trapped by them, she also could not completely escape them. Even after Ansset gave up and went to sleep she lay awake, dreading the next day. I was worried about how this would affect the boy, she thought ironically. It's my Control that's in danger, not his.

Ansset sang to her sporadically through the next day, and she found that, awake, she could resist him better than in the weariness of evening. Yet the resistance took effort, and when evening came she was even more tired than before, and the ordeal was even harder.

But her Control did not break, and while Ansset could sense emotions that her Control hid from others, he apparently did not realize how close he had come to success. On the sixth day he fell silent again, much to her relief. And he showed signs of the tension on him. He exercised more often. He looked at her more often. And he touched the door twice.

16

Is she insane? It occurred to Ansset more than once. He could conceive of no reason for her to have locked him up in absolute silence. Neither silence nor singing did any good. What did she want?

Does she hate me? That question had arisen often enough in the last few years. During his ban he had found the pressure almost unendurable. But he trusted her—whom else could he trust? It was terrible to know that everyone was wondering what he had done wrong, when he knew but could not tell them that he had done *nothing* wrong. And her mad ideas about his mind—often he could not understand what she was getting at, but sometimes he felt he was getting closer. She accused him of not singing from himself. And yet he knew that his singing was exhilaration, the one great joy of his life. To look at people and understand them and sing to them and change them; he almost recreated them, almost felt as if he could take them and make them over, make them better than they were. How could this not be coming from himself?

And now silence. Silence until his head ached. In all his life there had been no such silence, and he didn't know what to make of it. Why did you become so close to me, if you only meant to cut it off? And yet she wasn't cutting it off, was she; here he was in the High Room, spending every moment with her. No, she wasn't just trying to hurt him. There was a purpose in this. Some insane purpose.

Somehow she has misunderstood me. It made Ansset sad that everyone so consistently failed to understand him. The children couldn't be expected to; the masters and teachers hardly knew him; but Esste. Esste knew him as completely as anyone could. I have sung every song I have to her, and she has refused them all. I showed her that I could sing to a theater of strangers and change them, and she told me I had failed! She can't admit that I can do any good.

Is she jealous? She was a Songbird

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herself. Can she see that I'm better than her, and does that make her want to hurt me? This thought appealed to him because it offered some rational explanation. It *might* be true, while insanity was clearly out of the question no matter how often he tried to persuade himself of it. Jealousy.

If she realized it, she wouldn't persecute him anymore. They could be friends again, like that day on the mountain by the lake, when she taught him Control. He had not understood it before then. But the lake—that was clear, that had told him the *reason* for Control. It wasn't just a matter of *not* crying, of *not* laughing, of holding still when told to, all the meaningless things that he struggled with and hated and resented as he studied in the Common Rooms. Control was not to tie him down, but to fill him up. And the very day of that lesson, he had relaxed, had allowed Control to become, not something outside himself that pressed him in, but something inside himself that kept him safe. I have never been happier. Life has never been easier, he thought at the time. It was as if the anger and fear that had constantly plagued him before had disappeared. I became a lake, he thought, and only when I sing does anything come out. Even then, the singing is easy, it comes lightly and naturally. Because of Control I can see sorrow and know its song. It doesn't make me afraid as it did before—it gives me music. Death is music, and pain, and joy, and everything that people feel—it is all music. I let it all in and it fills me up and only music comes out.

What is she trying to do? She doesn't know.

I have to help her. I have used my music to help strangers in Step, to awaken sleeping souls in Bog. But I have never used it to help Esste. She's troubled and doesn't know why, and thinks that it's my fault. I will show her what it is she really fears, and then perhaps she will understand me.

When I sang before I tried to calm her fear. This time I will show it to her more clearly than she has ever seen it.

And with that decision made, Ansset slept on the eighth night of his stay in the High Room. He gave no outward sign, of course, of what had passed through his mind. His body had been as rigid as when he sang, as when he slept.

17

Ansset did not sit on the periphery of the room or exercise periodically as he had before. On the eighth day of the confinement he sat in the middle of the floor, directly before the desk, and looked at Esste as she worked. He is going to attack today, Esste immediately concluded, and braced herself inwardly. But she was not ready. There was no brace to cope with what Ansset did to her today.

His singing was sweet, but not reassuring. Instead the song kept forcing memories into her mind. He had found the melody of nostalgia. She struggled (outwardly placid) to keep working. But as she went over reports of lumbering operations in the White

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Forest she no longer felt like Esste, the aging Songmaster of the High Room. She felt like Esste, Polwee's Songbird, and instead of stone walls she saw crystal out of the corners of her eyes.

Crystal of the palace Polwee had built for his family on the face of a snow-covered granite mountain, a palace that looked more like nature's work than the mountain around it. All the world seemed artificial once she had seen Polwee's home. But she remembered it better from the inside than out. The sun shining through a thousand prisms into every room, a hundred moons rising wherever she looked at night, floors that seemed invisible, rooms whose proportions were all wrong and yet completely perfect, and more than all the beauty of the place, the beauty of the people.

Polwee was the easiest placement anyone could remember. He had come to the Songhouse to apply for a Songbird or a singer only a few weeks before Esste was ready to be placed. He had talked to Songmaster Blunne and in the first minute she had said, "You may have a Songbird." He had never asked the price, and when it came time to pay it never minded that it was half his wealth. "All my wealth would have been worth it," he told her when she left to return to the Songhouse at the age of fifteen. Only good people had come, only kind people, and in Polwee's palace there was always love and joy to sing about.

Love and joy and Greff, Polwee's son.

(I cannot remember this, said a place in Esste's mind, and she tried to continue with her work, but now it was the High Room that was at the periphery of her vision and the reality was all crystal and light. She sat stiffly at the table, her Control keeping her from betraying any emotion, but utterly unable to work or pretend to work because Ansset's song carried too far, too deeply into her.)

Greff was his father's son. Concerned more for her happiness than his from the moment she arrived. He was ten and she was nine; and the last year the drug's effects began to wane and Esste reached puberty only a few months ahead of schedule. It had no effect on her voice yet, and showed only slightly in her body. But Greff was growing an adolescent mustache, and he was even more tender than before, touched with shyness that made her feel an infinite fondness, and they had made love quite by accident as snow fell on the crystal one winter.

It was not forbidden, was not really even a failure of Control—she had sung throughout, and learned new melodies as she did. But she did not want to leave him. She realized that Greff was more important to her than anybody in the Songhouse. Who had ever loved her like this? Whom had she ever loved? She tried to be rational, to tell herself that she had been nearly seven years, almost half her life with Greff as her closest friend, that no matter how she felt about him she was a creature of the Songhouse and would not be happy living outside

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forever. She tried to be rational.

It made no difference. The Songmaster came to take her home, and she refused to come.

The Songmaster was patient. He was still in middle age; it would be years before he would be named Songmaster of the High Room, and Nniv had not learned the brusqueness that enabled him to bear later, heavier responsibilities. So instead of arguing, Nniv merely asked Polwee if he could stay for a while. Polwee was concerned. "I didn't know anything about it," he kept saying, but as Nniv later sang to Esste, "It wouldn't have mattered if he knew, would it?" Of course it wouldn't. Esste was in love with Greff from their first childish romps through the crystal the year that she arrived.

The longer Nniv stayed, the more patiently he waited, the more the memory of the Songhouse became important to her. She began to remember her teachers, her master, singing in chamber. She began to spend more time with Nniv. One day she sang a duet with him. The next day she came home.

(Ansset's song did not relent. Esste had not remembered this day in years. And had never remembered it with such clarity. But she could not resist him, and she lived through it again.)

"I'm going, Greff."

And Greff looked at her with surprise on his face, hurt in his voice as he spoke. "Why? I love you."

What could she explain? That the children of the Songhouse needed other singers as much as they needed to sing? He'd never understand that. She tried to tell him anyway.

"Esste, Esste, *I* need you! Without your songs—"

That was another thing. Songs—she would always have to perform, forever if she stayed with Greff. She could not refuse to sing, but already, after only seven years, singing for people whose only songs were coarse approximations of what they thought and felt, or (worse yet) lies, she was weary of it.

"You don't have to sing if you don't want to!" Greff cried, desperation in his voice, tears on his face. "Esste, what has this Songmaster done to you? You were prepared to defy armies in order to stay with me, and suddenly today you don't care about any of that, you're ready to leave me without a second thought."

She remembered his embrace, his kisses, his pleading, but even then her Control had worked, and he finally backed away, hurt beyond describing because her body had been cold to him. Patiently she explained the one reason he would understand. She told him about the drug that put off puberty for years, how the drug had no permanent effect beyond the one that counted—singers and Songbirds were sterile for life. "Why else do you think we bring children in from outside? It wouldn't do for children to be born in the Songhouse. We'd be more concerned with being parents than with being singers. I can't marry you. There'd be no children."

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But he insisted, demanded. He didn't care about children, just cared about her, and she finally realized that love wasn't just giving, it was also—

(I don't want to remember this! And Ansset's song did not give up—)

It was also possession, ownership, dependence, self-surrender. She turned and walked out of the room, went to Nniv, told him she was going with him back to the Songhouse. Greff stormed into the room, a bottle of pills in his hand, threatening to kill himself if she left. She had no answer for him, only wished that he had been able to take it with grace, only wished that people outside the Songhouse could also learn Control, for it smoothed pain as nothing else in life could. So she told him, "Greff, I'm going because Nniv and I sang a duet last night. You can never sing with me, Greff. So I can't stay with you."

She turned and left. Nniv afterward told her that Greff swallowed the poison. Of course he was saved—in a house full of servants suicide is difficult to accomplish and Greff had no real intention of dying, just of forcing Esste to stay with him.

It had taken all of Esste's control, however, not to turn back, not to change her mind at the entrance of the starship and plead for a chance to stay with Greff. She had Control, however.

Control had saved her. And Ansset's song insisted:

Leave me in Control. Do not break my Control.

It was night. She sat by the table, the electric light on overhead. Ansset was asleep in his corner of the room. She did not know how long ago he had gone to sleep, how long ago his song had ended, or how long she had sat stiffly by the table. Her arms hurt, her back ached, the tears that her Control had barely contained pressed behind her eyes and she knew that the victory today had been Ansset's. There was no way he could know what parts of her past were most painful—but his singing could evoke those memories anyway, and she dreaded the morning. Dreaded the morning and the songs Ansset would sing, but she lay down anyway, slept instantly, dreamed nothing, and the night passed in a moment.

18

It was the fourth day that Ansset had tormented Esste. It was near dark outside, and the High Room was growing cold. He had stopped singing an hour ago, but he could not move. He sat in the middle of the floor and looked at Esste and was afraid.

She sat still, her eyes open, looking forward but seeing nothing. Her hands rested on the table in front of her. She had not moved from that position since Ansset began his song in the morning.

And now he was full of doubt. He did not understand what was happening to her. The first time he had been excited because he had actually changed her. While her Control had held and she still remained silent, she had stopped work, had lost her struggle to concentrate on the computer in

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the table. He had thought the end would come the next day. But the next day she had held on, and the next, and today he realized that she was not going to break. He knew that these were the songs that would make her afraid. But he had no idea what fears he had summoned up.

Each night he had gone to sleep with her frozen at the table: each morning he had awakened to find her asleep in her blankets. When she woke she said nothing, hardly looked at him, just got up, ate, went to the table and began work. Each day he had started to sing and, each time a little sooner, she had stopped working and taken her day-long pose of studied inattention.

What am I doing to her behind her face?

Ansset felt restless, felt that he had to move. He delayed (Control) and when he got up he got up slowly (Control) and did not walk back and forth but instead headed directly for a shutter and tried to open it and realized that the very attempt was a sign that his Control was slipping. At the thought he was instantly aware of the walls of rock inside him, the deep and placid lake that grew ever deeper within them. But something was stirring at the bottom of the lake.

He touched the cold stone wall between the windows and heard the whine of wind outside. Perhaps the first storm of fall was coming. Why had she brought him here? What was she trying to achieve?

What have I done to her?

He looked into the lake, looked deep and began to understand what was happening to him. After eleven days in the High Room he was beginning to be afraid. Things were out of his control. He could not leave. He could not force Esste to speak to him, or even to weep or show any sign that she felt anything at all. (Why is it so important that she show a sign of feeling?) And now he was feeling things within the walls of his Control that did not belong there. Fear stirred at the bottom of his calm. Fear, not just of what would happen to him in the High Room, but of what he might have done to Esste. He could not put it into words, but he realized that if something happened to her, something would happen to him. There was a connection. They were linked somehow, he was sure of it. And by raising her fears he had raised his own. They lurked. They waited. They were inside his walls and he did not know how he would be able to control them.

Speak to me, Esste, he said silently. Speak to me and be angry with me and demand that I change, abuse me or praise me or sing idiotic songs about the cities of Tew but stop this hiding from me!

She did not look alive or human, her face empty like that, her body motionless. Human beings moved, their faces expressed things.

I will not break Control.

"I will not break Control," he sang softly. But in the moment of singing he knew it was not true, and the fear moved sluggishly within him.

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19

It was her childish nightmare that held her. A roaring in her ears and a vast invisible globe that grew and grew and rolled toward her to crush her swallow her fill her empty her....

And the globe reached her, roaring like a storm at sea. She was a little girl holding the blanket up tight to her neck, lying on her back, her eyes wide open seeing and not seeing the ceiling of the Common Room, seeing and not seeing the vast roar that had filled the vast hall. She opened her hands to press against the globe, but it was too heavy and she could not lift her hands against the weight. She closed her hands into fists, but the stuff of the globe could not be shut out so simply, and it squeezed in between her fingers and into her fist so that instead of shutting it out she was holding it in. If she opened her mouth it would enter and fill her. If she closed her eyes it would be able to change without her seeing. And so she lay there hour after hour until sleep overcame her or until she screamed and screamed.

But no one ever came, because she never made a sound.

The stone wall emerged from the shadows. It was dark night, and the light through the cracks in the shutters was gone. Ansset was no longer in the middle of the room. She could see him asleep sitting in the corner, his blanket wrapped around him. The wind whistled outside; it was cold. She reached stiff and painful fingers down to the computer and made the room warmer. She was inured to cold, but Ansset was still young. Freezing him to death would accomplish nothing.

She got up slowly, so that her body could adjust to movement. Her back protested. But the pains of her body were nothing. Today had been worse than ever, not a memory of the past at all, but the terrors of childhood returned with a vengeance. I cannot last another day of this.

She had said the same thing to herself yesterday; yet she had lasted.

How am I different from him, she wondered. I, too, am hiding behind my Control. I, too, am unreachable, express nothing to anyone but what I choose to express. Perhaps if I unbent, broke Control just a little, he too would come out and be human again.

But she knew she would not try the experiment. He would have to open first. If she moved first it would all have been wasted, and he would be stronger and she weaker the next time it was tried. If there was a next time. Twenty-two days. It was the twelfth night, tomorrow would be the twelfth day, they were more than halfway through the time and she had accomplished nothing of importance except that her own strength was flagging and she wondered if she could last another day.

She walked to her blanket roll, and spread the blankets on the floor and bent over to lie down. But in the bending she glanced at the corner where Ansset was sleeping, and she quickly looked up again and stared and realized that Ansset was not asleep as he had been every other time. His eyes

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were open. He was watching her.

Don't sing! she cried out silently. Let me have peace!

He did not sing. He just watched. And then, in a controlled, quiet voice that expressed no emotion whatsoever he said, "Can we stop now?"

Can we stop now? If it hadn't been for Control she would have laughed hysterically. *He* asks *her* for mercy? His voice was still ice; the battle was still going on; but he had asked for it to end, and somehow that made her feel that she had, after all, made some progress. No. She hadn't made the progress. *He* had. It was a sign that maybe this would end.

She slept a little better that night.

In the morning, a message waited on the computer. Riktors Ashen had sent a regretful note that the emperor had cancelled several of his errands and he would be arriving on Tew a week ahead of schedule. The emperor had been most explicit. The Songhouse had promised him a Songbird. He needed the Songbird now. If the Songbird did not come with Riktors Ashen immediately, Mikal would know that the Songhouse did not intend to keep the promise made by Songmaster Nniv.

A week early. Three days from now.

She ate breakfast with Ansset, silently, and wondered if there was any hope of finishing this now.

Sitting for her day's work at the table, Esste steeled herself for Ansset to sit in the middle of the floor and start to destroy her with a song. Today it did not happen. Today Ansset walked around aimlessly, stroking the rock, sitting down and standing up again almost immediately, trying the door, trying the shutters. He hummed as he did, but the humming expressed almost nothing, a hint of impatience, and under that an even fainter hint of fear, but he was not trying to manipulate her with his voice. At first she was relieved beyond expression, but soon, as she began to pursue the work that had gone undone for three days, she began to worry about Ansset again. Now that he was giving her a rest from fearing for herself, she could care about him.

The strain was beginning to show in his face. His eyes were not empty. They darted back and forth, unable to rest on one object for long. And he was biting his cheek occasionally. Control was breaking down. Why now? What had happened to *him*?

I have to watch him now, very carefully. I'm playing with fire, playing along the rim of his destruction, I must know the moment when I can speak to him. He must not be allowed to pass into despair.

Three days.

In the afternoon Ansset's aimless humming turned into speech. At first Esste could hardly hear him and wondered if he was even talking to her. But soon the words became clearer and, she noticed, he was exactly filling the High Room with his voice and speaking no louder. The voice was still under Control: it expressed, but only what he wanted it to express.

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"Please please please," said the controlled careful meticulous voice, "please please please I've had enough can I please go or will you please say something to me I don't know what you're trying to accomplish I don't understand any of this but please I can't stand it anymore please please please...."

Ansset's voice droned on and he didn't look at Esste, looked instead at the walls and the windows and the floor and his own hand, which did not tremble when he looked at it but wavered ever so slightly when he did not. She had not seen him move a muscle when he sang in years. This movement was not voluntary, but it was *movement,* and the very involuntariness of it spoke of terrible things going on inside Ansset's mind. She wanted to reach out and comfort him and stop the muscles from trembling. She did not, however. She stayed at the computer and worked as she listened to his voice drone on.

"I'm sorry I made you afraid I'm sorry I'm sorry I'm sorry please can this be over I'm afraid of you I'm afraid of this room let me hear your voice Esste Esste Esste please...."

His voice finally faded into silence again and he sat by the door, his face pressed into the heavy wood.

20

I have begged and she hasn't answered. The whales are swimming deep inside me and she doesn't help. I need help. All the monsters in the world are inside me instead of outside me I've been tricked and trapped and they are inside my walls not outside my walls inside with me and she won't help me. When I stop thinking about a muscle it shakes. When I stop thinking about a fear it leaps at me. I'm drowning but the lake keeps getting deeper and deeper and deeper and I don't know how to get out the walls go up forever and I can't climb over and I can't break through and she won't talk to me.

Ansset pressed his face into the wood of the door until it hurt terribly, and the pain helped.

He remembered. He remembered singing. He could hear all the voices. He heard the other children in chamber. He heard the voices in his class of Breezes and his class of Bells and his class of Groans. Voices at meals. Voices in the toilet. The voices of the strangers in Step and Bog. Rruk's voice as she helped him learn how things were done in the Songhouse. All the voices sang at once to him but there was only one voice that he could not recognize, that he could not hear clearly, a dim and distant voice that he did not understand.

But it was not a Songhouse voice. It was coarse and crude and the song was meaningless and empty. But it was not empty, it was full. It was not meaningless, for he knew that if he could once hear the song, really hear it through the din of the other voices that it would help him, that the song would mean something to him. And as for coarseness and crudeness, the song he tried to hear did not jar on him at all. It made him feel as comfortable as

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sleep, as comfortable as eating, as the satisfaction of all the miserable desires. He strained to hear, he pressed his face into the wood, but the voice would not come clear.

Not for hours, and he rubbed his face back and forth against the wood, and threw himself to the stone floor, so the pain would drive all the other voices out of his mind, would let him hear the one voice he searched for, because that voice would save him from the terror that swam every moment closer to the surface where he watched and waited helplessly.

21

The vigil lasted all night. Esste watched as Ansset drove the splinters of the door into his nose and brow and cheeks until blood flowed. She watched as he tried to grip and tear the stone until his nails broke. She watched as he slammed his face into the rock walls until he bled and she feared he would cause permanent damage. It seemed he would never sleep. And in between the self-mutilation he would, in a wooden, controlled voice, his body held as rigid as he could hold it for all the trembling, say, "Now please. Now please. Help me." There was Control, but that was all. No music. His songs were gone.

Just for the moment, she told herself. Just for now. His songs, his good songs, will come back if I just wait for this to run its course, like a fever that has to break.

Morning came and Ansset was still awake. He had stopped thrashing, and Esste went to the machines for food. She set it in front of him, but he did not eat. She reached a piece of it to his mouth, but instead of taking the food he bit her, he set his teeth into her fingers with all his strength. The pain was excruciating, but Esste's Control was not even tested by this—physical pain, at her age, was the least of her weaknesses. She waited patiently, saying nothing. Blood from her fingers drooled out of Ansset's mouth for minutes as both silently looked at each other. And it was Ansset who made the first sound, a moan that sounded like the slow breaking of rock, a song that spoke only of agony and self-hatred. Slowly he released his bite on her fingers. Pain rushed up her arm.

Ansset's eyes went blank. He did not see her.

Esste went to the machine and covered her fingers with salve. She was exhausted after a night of no sleep, and Ansset's savage bite had disturbed her far more than the mere pain. I will stop. This has gone too far, she decided. Her hand shook, despite Control, despite the calm she tried to enforce on herself. I can't do this anymore, she said silently.

But for twelve days she had been silent, and sound did not come easily to her throat. Came with such difficulty, in fact, that as she looked at Ansset's blank face she could not make any sound come. Instead she lay down on her blanket, unused that night, and slept.

She awoke to the sound of wind howling through the High Room. It

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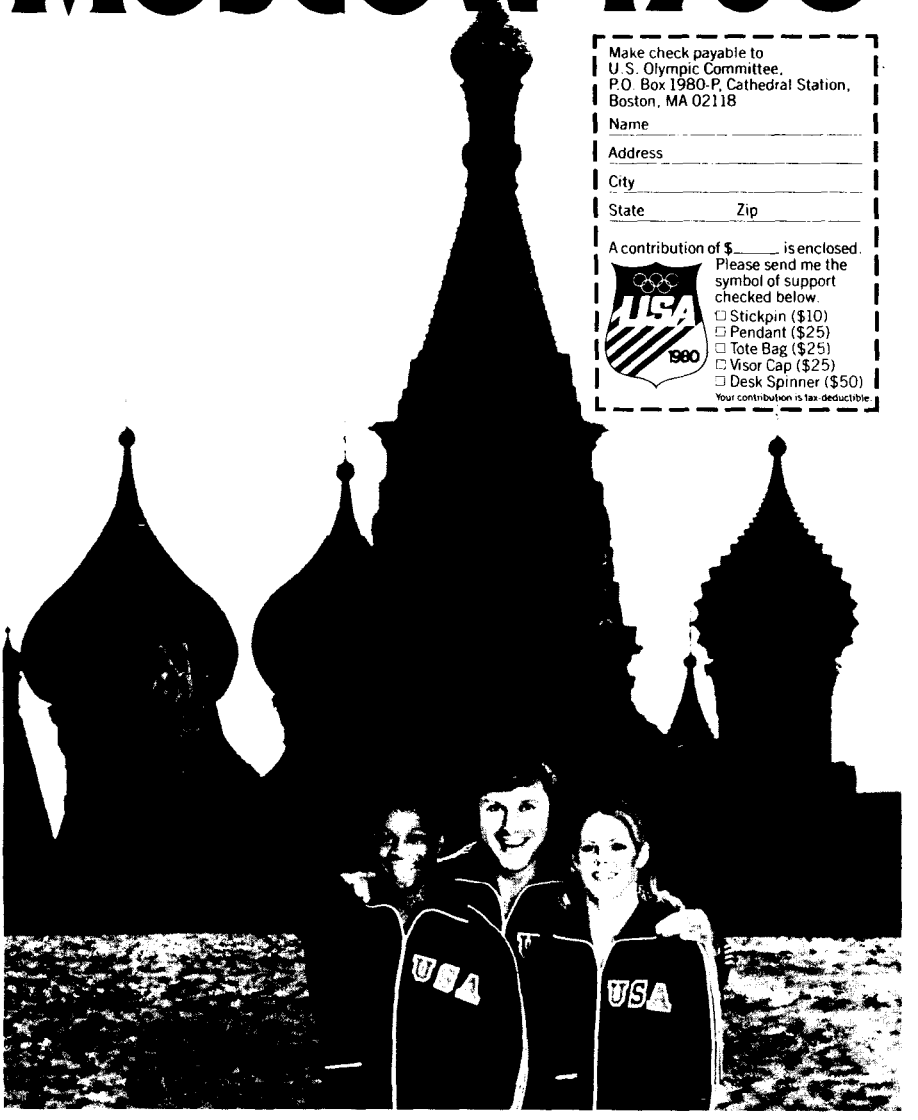

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was cold, icy even under the blanket. It took only a few moments for her to realize what that meant. She leaped up from the floor. It was afternoon, but dark with wind and clouds. The clouds were so low that mist trailed into the High Room with every gust of wind, and the ground was invisible. Every shutter of every window was open, some of them banging against the stone walls outside.

He has jumped from the tower. The thought screamed in her mind, and she gasped aloud.

Her gasp was answered by a moan. She whirled and saw Ansset lying on the table, curled up with the thumb and little finger of his right hand in his mouth, the other fingers pressed into his forehead and eyes like an infant's involuntary pose. The relief that swept over her forced her to lean on the table, taking her breath in great gasps. Any illusion of Control was gone now. Ansset had won, forcing her to break before her task was completed.

The cold forced her to take action again. She went to the windows and closed them all, leaning out over the sills to catch the handles of the shutters and pull them closed. The mist was so dense that it seemed to swallow up her hand as she reached into it. But inside she was singing. Ansset had not jumped.

The windows closed, she returned to the table, and only now realized that Ansset was asleep. He trembled with cold and, probably, exhaustion, but he had not seen her panic, her relief, had not heard her gasp. Her first thought was gratitude, but she realized that it might have been good for him to see that fear for his safety could overcome even Esste's iron reserve. It is as it is, she told herself, and looked in his left hand for the key to the shutters, found it, and went around and locked them all, then replaced the key on the chain which had fallen to the floor after he took it from her neck in her sleep.

She went to the computer and turned up the heat in the High Room. Instantly the stones under her feet grew warm.

Then she took her blanket and Ansset's and covered the boy where he lay on the table. He stirred slightly, moaned and whimpered, but did not awaken.

22

Ansset's face was stiff when he awoke. He was not cold anymore. His head ached, and where the splinters had been driven into his face the stinging was a constant undercurrent. But he felt something cool touching his face, and wherever it touched the stinging went away. He opened his eyes just a little. Esste leaned over him dabbing salve on his face. For the moment Ansset forgot everything bad and carefully said to her, "I didn't jump. They told me to jump and I didn't."

She said nothing. She said nothing at all, nothing at all, and her silence was a blow that knocked him back in on himself, and his struggle returned. The water was rushing up to meet him,

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a vast whirlpool sweeping higher and higher and Ansset was at the top and there was nowhere higher that he could go to escape it. He looked inside himself and there was no escape and as the water touched him, swept his feet out from under him, bore him in fast, dizzying circles around and around, he screamed. His scream was a voice that filled the High Room and echoed from the walls and shattered the stillness of the mist outside.

He was no longer in the High Room. He was being sucked down into the maelstrom. The water closed over his head. Spinning faster and faster he plunged deeper and deeper toward the mouths of the waiting terrors below. One after another they swallowed him up. He felt himself being swallowed, the massive peristalsis driving him into gullet after gullet, hot warm places where he could not breathe.

And he was walking into a room. Walking and walking but getting no farther into the room than he had been before. And all alone, no other sound, he heard the song he had been searching for. Heard the song and saw the singer, but could not hear and could not see, not really, because the singer had no face that he could recognize, and the song, no matter how carefully he listened, kept escaping the moment after he heard it. He could not hear the melody in his memory, only in the moment, and as he looked at an eye the other eye vanished, and when he looked for the mouth the eye he had seen before disappeared from sight.

He was no longer walking, though he had no memory of reaching the woman who lay on the bed. He reached out. He was touching her face. He was stroking her face so very gently, tracing the features, the eyes, the mouth, and the voice sang, "Bi-lo-bye. Bi-lo-bye," but the moment he understood the words he lost them. Lost them, and the mist came and swallowed up the face. He clutched for it, held it, held it tight; she could not disappear from him in the mist which was all white invisible faces that swallowed her up. This time he held on tightly and he would not let go, nothing could pull him away.

He heard the song again, heard the song and it was exactly the same song and this time the words were:

I will never hurt you.
I will always help you.
If you are hungry
I'll give you my food.
If you are frightened
I am your friend.
I love you now
And love does not end.

He knew where he was now. Somehow he had been pulled from the lake. He lay on the shore of the lake and he was dry and safe and the song he had been searching for had at last been found. He still gripped the face tightly, clinging to the hair, holding the face close over his own as he lay there, and he knew her at last, and cried for joy.

23

Ansset lay across Esste's lap, his

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hands frantically gripping her hair, when at last his violent shaking stopped,and his jaw slackly opened, and his eyes at last focused and he saw her.

"Mother," he cried, and there was no song but childhood in his voice. He called softly again, "Mother."

Esste opened her mouth, and tears poured from her eyes, and flew as she blinked to Ansset's cheeks, and she sang from the deepest part of her heart. "Ansset, my only son."

He wept and clung to her, and she babbled meaningless words to him, sang her most soothing songs to him, and held him tightly. They lay on the blankets in the warm High Room as the storm raged outside. As she held his bruised and cut face into her shoulder she also wept; for two hidden places had been plumbed, and she did not know or care which had been the greater achievement. She had locked him into silence in the High Room in order to cure him; he had returned the favor, and she, too, was healed.

24

It was the afternoon of the fourteenth day. Sunlight streamed through the cracks on the western shutters. Ansset and Esste sat on the floor of the High Room singing to each other.

Ansset's song was halting, though the melody was high and fine, and his words were all the agony of loss and loneliness as he grew up, but the agony had been transformed, was transformed even as he sang, by the harmony and countermelody of Esste's wordless song which said not to fear, not to fear, not to fear. Ansset's hands danced as he sang, played gently along Esste's arms, face, and shoulders, kept capturing her hands and letting them go. His face was slight as he sang, the eyes were alive, and his body said as much as his voice did. For while his voice spoke of the memory of fear, his body spoke of the presence of love.

25

Riktors Ashen was not sure what to do. Mikal had been emphatic. The Songbird was to return with Riktors Ashen. And yet Riktors knew that he could not achieve anything by bluster-ing or threatening. This was not a national council or a vain dictator on an unsophisticated planet where the emperor's very name could inspire terror. This was the Songhouse, and it was older than the empire, older than many worlds, older than any government in the galaxy. It recognized no nationality, no authority, no purpose except its songs. Riktors could only wait, knowing that delay would infuriate Mikal, and knowing that haste would accomplish nothing in the Songhouse.

At least the Songhouse was taking him seriously enough that they left a full-fledged Songmaster with him, a man named Onn whose every word was reassurance, though in fact he promised nothing at all.

"We're honored to have you here," Onn said.

"You must be," Riktors answered, amused. "This is the third time you've

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said so since my arrival."

"Well, you know how it is," Onn said with good cheer. "I meet so few outsiders that I hardly know what to say. You'd hardly enjoy hearing the gossip of the Songhouse, and that's all I know to talk about."

"You'd be surprised at how much interest I'd have in gossip."

"Oh, no. We have singularly boring gossip," Onn said, and then changed the subject to the weather, which had been alternately rainy and sunny for days. Riktors grew impatient. Weather mattered a great deal to the planet-bound. To Riktors Ashen weather of any kind was just one more reason to be in space.

The door opened, and Esste herself entered, accompanied by a boy. Blond and beautiful, and Riktors recognized him instantly as Ansset, Mikal's Songbird, and almost said so. Then he hesitated. The boy looked different somehow. He looked closely. There were scratches and bruises on his face.

"What have you been doing to the boy?" asked Riktors, appalled at the thought that the child might have been beaten.

It was Ansset himself who answered, in tones that inspired absolute confidence. The boy could not lie, said his voice: "I fell on the woodpile. I knew better than to play there. I was lucky not to break a bone."

Riktors relaxed, and then realized another, more important reason why the child looked different. He was smiling. His face was alert, his eyes looked warm and friendly. He held Esste's hand.

"Are you ready to come with me?" Riktors asked him.

Ansset smiled and sighed, and both melted Riktor's normal reserve. He liked the boy immediately. "I wish I could come," Ansset said. "But I'm a Songbird, and that means that I must sing to the whole Songhouse before I go." Ansset turned to Esste. "May I invite him to attend?"

Esste smiled, and that surprised Riktors more than the change in Ansset. He hadn't thought the woman knew how to seem anything but stern.

"Will you come?" Ansset asked.

"Now?"

"Yes, if you like." And Ansset and Esste turned and left. Riktors, unsure of himself, looked at Onn, who blandly returned his gaze. I was invited, Riktors decided, so I can follow them.

They led him to a large hall which was filled with hundreds and hundreds of children who sat on hard benches in absolute silence. Even their bare feet on the stone made little noise as the last of them filed into place. Scattered among them were many teenagers and adults, and on the stone platform at the front of the hall sat the oldest of them. They were all dressed alike in the drab robes that reached the floor, though none of the children seemed to have clothing that exactly fit. The impression was of poverty until he looked at their faces, which looked exalted.

Esste and Ansset led him to the rear of the hall, at the end of the center

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aisle. Riktors was surprised to have been given such a poor seat; he did not know, and no one at the Songhouse ever told him, that he was the first outsider in centuries to witness a ceremony in the great hall of the Songhouse.

He did not even know it was a ceremony. Ansset and Esste merely walked, hand in hand, to the front of the hall. Esste stepped onto the platform, then reached down a hand to bring Ansset up. Then the Songmaster retired to a chair on the platform while Ansset stood alone in front, at the head of the aisle, where Riktors could see him clearly.

And he sang.

His voice filled every part of the hall, but there was no resonance from the walls to distort the tone. He rarely sang words, and those he sang seemed meaningless to Riktors. Yet the emperor's envoy was held spellbound. Ansset's hands moved in the air, rising, falling, keeping time with odd rhythms in the music. His face also spoke with the song so that even Riktors, at a distance, could see that the song came from Ansset's soul.

No one in the hall wept, not even the youngest Groans with the least Control. Control was not threatened by Ansset's song, and it did not reflect the feelings of the audience. Indeed, the song divided the audience into every separate individual, for Ansset's song was so private that no two people could hear it the same way. The song made Riktors think of plunging down between planets, though the child could not possibly have experienced a pilot's thrill of vertigo. And when Ansset at last fell silent the song lingered in the air and Riktors knew he would never forget it. He had shed no tears, felt no terrible passions. Yet the song was one of the most powerful experiences of his life.

Mikal has waited a lifetime for this, Riktors thought.

All the children and adults in the hall arose, though he had seen no cue given. And all of them began to sing, one by one, then all together, until the sheer weight of sound made the air in the hall feel thick and aromatic with melody. They were saying good-bye to Ansset, who alone was silent, who stood without weeping on the platform.

They were still singing as Ansset stepped from the platform, and without looking to the left or the right walked down the aisle to where Riktors waited. Ansset held out his hand. Riktors took it.

"Take me with you," Ansset said. "I'm ready to go."

And Riktors' hand trembled as he led Ansset from the hall, as he took him to the flesket waiting outside that would carry them both to Riktors' starship. Riktors had seen wealth, had seen the opulence of Mikal's palace at Susquehanna, had seen the thousand most beautiful things that people made and bought and sold. None of them was worth the beauty that walked beside him, that held his hand, that smiled at him as the Songhouse door closed behind them. ■

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FutureFood

by David Ritchie

Talk about optimism. While standing in line at the MIT bookstore one day, I overheard a conversation in the line behind me: "If we can break the light barrier, then colonizing other star systems will be easy!"

Well, here's to breaking all the barriers which keep us confined to this planet. But before we conquer the light barrier or even achieve a decent fraction of *c* with a spaceship, another and more important barrier must fall: the food barrier.

There, in four letters, is the single biggest concern of our world today: FOOD. If we are ever to have a world economy capable of supporting a very large space effort—that is, one capable of setting up colonies on other planets or large space stations in orbit— we will have to avert mass starvation here on Earth within the next few decades.

If world population growth continues to outstrip world food production, then our planet will soon be able to grow only a small fraction of the food its people need. The result will be widespread social and economic chaos, and perhaps even nuclear war between the haves and have-nots.

In that event, *Homo sapiens* will be unable to reach out much deeper into the galaxy than he has already, and all our grandiose plans for the exploitation of outer space, from lunar mines to Dyson spheres, will go unrealized for want of a few loaves of bread.

Thus our future in space depends largely on how we deal with the problem of world hunger. And while that problem is surrounded by fear, hatred, pain, and despair, it is basically a matter of cold mathematics.

Just over 180 years ago, the British demographer Thomas Robert Malthus (1766-1834), in his *Essay on Population,* visualized the world's food problem as a race between two progressions: one arithmetical, the other geometrical. The first progression described the growth of food production, the second the growth of human population.

Malthus said that food production goes up arithmetically (1,2,3,4,5, . . .)

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because one acre of land can only support so much food. To double crop production, one must double the land area under cultivation.

If human populations also increased in arithmetical progressions, said Malthus, then everything would be rosy. Unfortunately, humans aren't so obliging. Human numbers tend to rise in geometrical progression (1,2,4,8,16, . . .), because humans have the inconvenient habit of turning out more offspring than are needed to replace the parents. So Malthus concluded that human population, under ideal conditions for growth, would always tend to outgrow the means of food production.

Of course, time has shown Malthus's analysis to be slightly flawed. In industrial societies, for example, family size becomes largely a matter of choice, thanks to adequate birth control measures; and as a result, national income (that is, the amount of food on the table) may increase faster than population does. Also, advances in agriculture such as high-yield crops and artificial fertilizers have helped increase food production per acre in

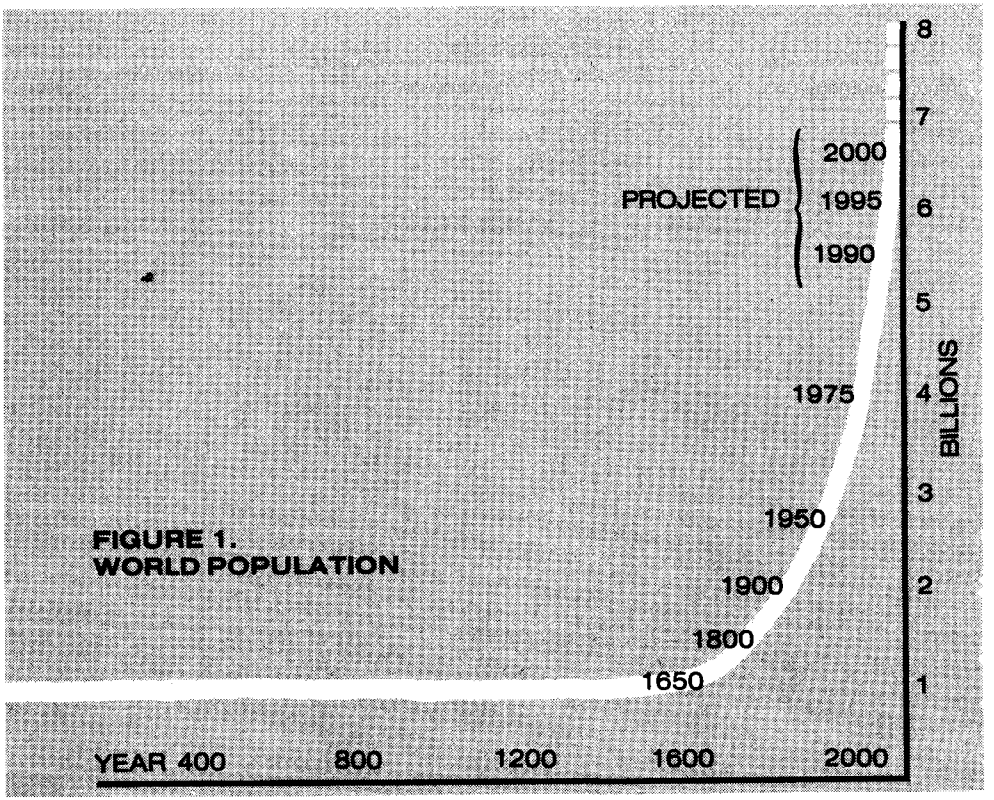

FIGURE 1.
WORLD POPULATION

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some countries to levels Malthus would have thought impossible.

But in nonindustrial societies—that is, most of the world—events have proven Malthus basically right. Human population has soared in the last half millenium, thanks in part to advances in medical research which wiped out such natural curbs to human population growth as smallpox and (in some countries) tuberculosis and cholera.

When the Pilgrims landed in New England, there were about half a billion people on Earth. By 1800, that figure doubled. Our planet reached the two-billion mark just after 1900, and four billion in 1975. So world population doubled once in the 150 years from 1650 to 1800, again in the next 100 years, and again in the next 75 years. Now, depending on whose estimates you read, the doubling time is only 30 to 50 years, so that there may be at least two growling bellies on Earth by 2029 for every one today.

Recently there have been some encouraging signs that human fertility is falling on a worldwide basis. China, for example, appears to have cut its birthrate by a whopping 20 percent in the last decade; the figure is now around 25 per thousand. There has been a similar sudden drop in fertility in Mexico and India, if recent estimates are reliable. And while some areas such as sub-Saharan Africa continue to show high birthrates, the trend is downward in Latin America. In the October 1978 issue of *The Futurist*, executive director Rafael Salas of the United Nations Fund for Population Activities says birthrates have dropped some 15 percent since the 1960's in several dozen nations which account for perhaps two-thirds of the underdeveloped world.

No one is sure just why the birthrate is falling so markedly, nor how variables other than fertility may bear on population growth in years to come. War, pollution, and epidemic disease all take their toll in human life, and it is impossible to say how many lives they will claim in the near future. We may get lucky, if "lucky" is the word, and have another pandemic like the Black Death, which killed a third of Europe. Nuclear war would have much the same effect. Overpopulation would be the least of our worries.

Also, degenerative diseases such as cancer are on the rise all over the world and may be expected to slow population growth a little. It has even been suggested that increased CO_2 concentrations in the atmosphere, brought on by burning coal and other fossil fuels, might enhance the "greenhouse effect" and raise mean annual temperature enough to affect synthesis of sexual hormones and make our species less fertile. (Dr. Dewey McLean of Virginia Polytechnic Institute proposes that a similar change in the Mesozoic air doomed the dinosaurs in exactly that way.)

But barring such catastrophes, it is safe to say the world of 2029 will have a few billion more bodies to feed, even if birthrates drop drastically. Even if the world achieved a two-child-per-family

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average by the year 2,000—a highly optimistic assumption—U.N. projections show the world's population would swell to just over seven billion by 2029, eight billion by 2050, and 8.4 billion by 2090, before leveling off around eight and a half billion.

How do we feed all those extra bodies? We can't, at present levels of world food production. Already about half the world is seriously undernourished. One out of every three persons gets barely enough calories per day to keep breath in the body. Many get even less than that, and starvation is now a leading cause of death in many Third World countries. Nor is that situation likely to improve in the near future, unless someone can find a way to get gigatons of food in a hurry.

We might barely make ends meet in the year 2029 by planting every available acre of arable land with high-yield grains and feeding the world on starches. The problem there is, those grains require petroleum-based fertilizers which the impoverished Third World cannot afford in these days of skyrocketing oil prices.

What about hydroponics? The idea of growing crops without soil fascinated the late Nikita Khrushchev, who saw in hydroponics a possible support for the shaky Soviet agricultural system. He quietly abandoned the idea, however, when experiments showed that fruits and vegetables grown hydroponically cost 10 times more than crops grown using ordinary methods.

Salt-water irrigation, as practiced in Israel and the U.S., might open up parts of some deserts to agriculture, but their contribution would be small. Plankton harvesting might add a few billion more calories per year to the world's cupboards, but reaping and processing the plankton is a costly process.

To make things still more complicated, nutrition is not merely a matter of shoveling calories into the body. A person can gobble 3,000 calories per day and still be undernourished, because the body requires protein as well as carbohydrates. (That Bible verse, "Man shall not live by bread alone," applies to the body as well as to the soul.)

Without adequate protein, the body develops a disease called kwashiorkor, or malignant malnutrition. Kwashiorkor makes one look like a survivor of Dachau. The belly swells, the hair loses its luster, and the muscles waste away as the body consumes its own muscle tissue in an effort to get needed protein. This condition is less a disease than a way of life in many parts of the Third World today, and is not unheard of even in the developed countries.

Nor are the ravages of protein starvation confined to the body. The mind suffers as well, because the brain needs protein to develop and function as it should. (High protein content is what gave fish the nickname "brain food.") Protein is especially important to the brain during childhood; and if a youngster is deprived of pro-

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tein for too long, the brain grows up "stunted" and can leave the person mentally retarded for life.

So the solution would seem to be a stress on protein production. But protein doesn't grow on trees—and that's the literal truth. Most major food plants are low in protein and high in carbohydrate, and the best source of high-quality protein is still animal tissue: beef, fish, pork, and so on.

Animal husbandry, however, requires huge amounts of food and other resources which could otherwise help to feed hungry humans. Raising animals such as cattle and pigs for food consumes lots of energy in transporting food to the animals, removing waste products, and so forth. In fact, most of the chemical and other energy used to put meat on U.S. tables goes into producing dung rather than meat; and dung never fed a hungry nation.

What, then, is the answer? Are we headed for a future of mass starvation where nations go to war over the scarce remaining food and plunge the planet into economic and social chaos? Or will everyone get enough to eat but grow up with dull minds because of protein starvation? It's hard to see how either of those societies could ever reach the stars.

But perhaps the future isn't quite so bleak. A lot of protein-rich food has been lying around us all along. We simply haven't looked for it in the right places. For example:

1. *Milk.* As a rule, Caucasians are the only race which, as adults, can digest the milk of cows and other ungulates. Unless they have an infusion of Caucasian genes from somewhere, non-Caucasians get upset stomachs and diarrhea from drinking milk, because they lack an enzyme which breaks down lactose, or milk sugar. So many non-Caucasian peoples are cut off from an excellent source of protein for want of an enzyme.

The reason for that missing enzyme has to do with climate and evolution. The original inhabitants of Asia, Africa, Australia, and the Americas lived in reasonably sunny climes where there was no lack of solar radiation to turn ergosterol in the skin into vitamin D. Thus they had no need to obtain that vitamin from milk and hence no reason to produce the needed milk-digesting enzyme. As infants, of course, they could produce enzymes to digest their mothers' milk, but the children lost that ability when they were a couple of years old.

Up north in the cold and cloudy climate of Europe, however, sunshine was harder to come by, partly because of the weather and partly because of the low incident angle of sunlight. So Europe's Caucasians were under pressure to find some way of getting vitamin D from sources outside the body, and natural selection eventually gave adult Caucasians the ability to digest the milk of other animals. (It has been suggested that "milk-digesting ability" is a good definition of a Caucasian people, and several years ago a team of interested researchers decided to test that

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hypothesis by reviewing cookbooks of different lands and seeing how many recipes called for milk. Sure enough, they found a strong positive correlation between the incidence of Caucasian genes and the number of recipes calling for milk, in most of the countries they investigated.)

Nowadays the Caucasian directors of hunger relief organizations in the United States and Europe tend to forget that biochemical difference between their race and others, and they often ship powdered milk overseas to starving nations—then act surprised when the recipients use the milk for whitewash instead of food. It's not surprising at all. Would you drink something you knew would make you sick, just because someone in an office 6,000 miles away said it was good for you?

Here's where biochemistry might help. Adding lactase (the milk-digesting enzyme) to milk might make the drink more palatable to Third World peoples and thus make available to them a huge source of high-quality protein.

And while we're at it, we may as well forget that old chestnut (conceived in reaction to the racist attitudes of Europe's colonialist period) that "all men are brothers under the skin." There *are* differences in physiology and body chemistry among the races, and one need not be a racist to accept that fact.

2. *Leaf protein.* Some twenty nations, including the U.S. and Britain, are studying ways to turn leafy plants into protein meal; and so far the results are encouraging.

Even without irrigation, researchers in the United Kingdom have gotten two tons of protein per year from a single hectare of fodder radish and mustard. It is estimated that cowpeas could do twice as well, because in short-term experiments cowpeas have yielded up to 17 kilograms of extracted protein per hectare per day. Other promising plants include beans *(Vicia faba),* peas *(Pisum sativum),* potatoes *(Solanum tuberosum)* and sugar beets *(Beta vulgaris).*

Extraction is simple. Leaves are crushed and pulped by machinery. Then a protein "curd" is extracted by heat coagulation, and the protein is separated from the "whey" by chemical treatment.

What makes leaf protein so attractive? For one thing, it could be made as a by-product of many widely grown food plants. For another, taking protein directly from plant leaves is more efficient than feeding the plants to animals and then slaughtering the animals for meat. Ruminant animals can turn only 10 to 30 percent of their forage protein into food suitable for humans, but one can extract 40 to 60 percent of the leaf protein directly from the leaves. That's a huge increase in efficiency.

Leaf protein concentrate (LPC) would violate no religious taboos against eating meat products—an important consideration in some parts of the Third World. And markets there for LPC are developing fast, because

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other common protein sources such as soybeans are getting more expensive all the time. If research is stepped up on ways to convert LPC into human food, then leaf protein might put a lot of cows out of work in a few years, and save some countries from mass starvation.

3. *Fur and feathers.* No, no one is suggesting you eat your cat or canary. But animal hair and feathers are loaded with protein that could be put to good use if properly processed.

Hair protein production for some animals actually exceeds that of edible meat protein. In the year ending June 1972, for example, the New Zealand Meat and Wool Board reported the world production of clean wool (almost 100 percent protein) was 1.55 million tons. That's three times the world production of protein from lamb, mutton, and goat flesh. So it's clear that sheep and goats wear most of their protein on the outside, where humans ordinarily don't look for it.

That same year, the United Nations reported that feathers plucked from the world's chickens contained almost as much protein (1.31 million tons) as the plucked birds themselves (1.77 million tons). It is estimated that if feathers were consumed along with the rest of a chicken, then the efficiency of protein conversion—that is, the ratio of protein assimilated to protein ingested—might rise from 18 to 32 percent.

It seems, then, that we are wearing or tossing away a veritable feast of protein. When you go to bed tonight, you may cover up with the protein equivalent of a flock of sheep and rest your head on the protein equivalent of a freezerful of chickens.

Unfortunately, fur and feathers in their natural state are indigestible, as anyone knows who has seen a cat cough up a hairball. The protein has been keratinized, or turned into the tough material of horns and hooves, so that the acids and enzymes in our stomachs have little or no effect on it. How do we turn that protein into a form the human gut can use?

A German biochemist named Kühne came up with the answer a century ago, when he discovered that finely ground hair could be digested with the help of pepsin. Later researchers followed up Kühne's work and found that feathers and finely ground cattle hooves made good animal food when given enzyme treatments to "soften up" the keratinized protein.

But the most important test is always on humans; and when protein "flour" extracted from fur and feathers was baked into cakes at Australian labs in the 1960's, a panel of tasters could tell little if any difference between cakes baked with ordinary flour and those which had their beginnings in heifer hooves.

Such flour is cheap to make and could satisfy a huge potential market for fur-and-feather protein concentrate all over the world. How long before some profit-minded manufacturer sees the future in "feather flour" and starts manufacturing it for

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export?

4. *Insects.* Bugs are our biggest competitors for grain and other foods, and humans lose billions of dollars' worth of wheat, corn, and other important crops to the depredations of insects every year. We have had some success in controlling insect pests with DDT and other insecticides, but in recent years the poisons have turned out to be about as dangerous as the insects themselves.

So let's consider another approach. As long as insects eat our food, why not eat the insects in return?

That suggestion may disgust many Americans and Britons, raised as they are on beef and fish and pork. In many other parts of the world, however, insects are delicacies and even staple foods. Africans have a passion for certain termites, and cave paintings thousands of years old show hungry hunters invading termite mounds for food. Australia's aborigines put protein in their diet by prying grubs from the soil, and American Indians used to smoke certain caterpillars out of trees and then gather up the half-asphyxiated insects as they fell onto the ground. Even in Europe and America, some insects are sold as novelty foods, such as chocolate-covered ants and grasshoppers.

Well, why not? On the whole, insects have more nutritional value than many of the junk foods we wolf down by the ton every day. When a British chemist examined the nutritional content of termites popular as food in the Belgian Congo in 1939, he found the termites were 36 percent protein by weight—more protein than one finds in beef (30 percent), bluefish (25 percent), shrimp (26 percent), and ham (21.5 percent). The termites were also an excellent source of potassium and phosphorus.

A hundred grams of fried African termites will provide about 550 calories. That value makes termites one of the richest foods on earth. And if termites average about 40 percent protein (some go as high has 46 percent), then a few handfuls would supply the U.S. minimum daily requirement for protein for a married couple—about 100 grams.

Silkworm pupae are another example of potential meals from insects. One analysis of their tissues revealed the little animals contain more than 23 percent protein, or about as much as shrimp and some food fish. And in many ways that old nemesis of farmers, the locust, looks best of all for dinner. Dried locusts are about 60 percent protein by weight, compared to 44 percent for dried salt fish. Moreover, the locust's fat content is only 14 percent or so—perhaps a little high for folks who watch their cholesterol, but nothing that a little processing wouldn't cure.

Raising insects for food might be easier than other kinds of animal husbandry, because bugs aren't too discriminating about what they eat. Termites could thrive on the billions of cubic feet of scrap wood the United States wastes every year, or on old newspapers that have been turned to pulp and mixed with simple sugars. A

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week's delivery of *The New York Times* might be turned into a week's protein supply for a person if termites were allowed to munch on the pages at the end of each day, and that protein could free grain to feed rumbling bellies in other parts of the world.

We already have the technology to raise bugs by the kiloton; just ask any biological supply house. The equipment to turn insects into protein concentrate is also available and could probably be used to put cans of the concentrate on the shelf in a few years, if there were a market for the food.

But there's the rub: finding a market. Americans and Europeans have traditionally been discouraged from eating insects and are likely to make a face if you hold out a locust for lunch. How can there be a demand for something the average person has such an aversion to eating? How could you persuade anyone to eat a "bug-burger?"

Here's where Madison Avenue might help. Advertisers have ways to sell just about anything to the public, from four-wheeled firetraps to candidates for public office. If advertising can sell the public on useless or even dangerous products (or politicians), then why not use it to push something as useful and nutritious as insect protein concentrate? Invent some pleasant-sounding acronym for it, toss in a dash of sex appeal and a hint of better health, and Americans could be gobbling bugs by the bushelful soon, in the form of protein-rich powder added to flour and other foodstuffs.

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Aversion to eating insects doesn't seem to be instinctive in humans: recall the grub-eating habits of the original Australian. Rather, our dislike of insect food appears to be learned, and so we should be able to "unlearn" it.

5. *Miscellaneous meats.* Lots of animals besides insects have edible flesh but are underutilized because they simply don't fit the popular image of food in many lands. Eating octopus is a sickening thought to many Americans, but not to the Mediterranean peoples. Some Mexicans make a nice snack out of land crabs, but hardly anyone else in the world thinks of the little crawlers as edible. Eels have had rather a bad name ever since King John of England died of an overindulgence in them, but the eel is no less edible for the King's mistake. Prawns, though popular in Britain, are virtually impossible to find in the United States. Crayfish are eaten with gusto in the Gulf states but hardly anywhere else in America. Goat meat strikes most Americans as an absurd food, but many U.S. tourists have been won over to it on visits to the Caribbean. And there are plenty of edible rodents besides the widely eaten rabbit; rats, properly raised and prepared, are said to be much like turtle meat in flavor and texture, and one biologist at a medical research center in Virginia reportedly found rat bones on his plate after consuming what he thought was turtle steak at a fashionable restaurant one evening.

Of course, no one should think these unorthodox protein sources can satisfy all, or even most, of the world's demand for protein in years to come. If we start exploiting these virtually untapped mines of protein now, however, then they might buy us a little more time in which to tackle the problem of overpopulation. And if we solve that problem, then perhaps we can survive as a species long enough to get off this planet and start exploiting the riches of outer space.

Anyone for roast rump of roach? ■

Suggested Reading

Food Protein Sources, edited by N.W. Pirie. Cambridge University Press, 1975.

Insects as Human Food, by F.S. Bodenheimer. Elsevier, 1950.

Population and Food, by Michel Cépède, François Houtart, and Linus Grond. Sheed and Ward, 1964.

ABOUT THE AUTHOR

David Ritchie, 26, is a science writer and illustrator living in the Boston area. Born and raised in Virginia, he has a B.A. in environmental sciences from the University of Virginia and is a senior member of The Word Guild in Boston. His articles have appeared in *Inquiry, Saga, Cavalier, Maine Life,* the *Boston Globe,* the *Washington Post, Newsday,* and numerous other publications. Although most of his articles deal with aerospace subjects, he has written on topics ranging from nuclear arms control to New England's lobster fisheries.

Ritchie's current projects include books on meteorites, alternative fuels, and animal physiology. He is unmarried and lives with two cats.

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The Malodorous Plutocrats

or The Stinking Rich

Sometimes a problem can be turned back on itself.

by Ian Stewart

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"But I don't *want* a sound-microscope!" said Billy the joat. "All I want is an ordinary fibroptic worm-runner, size seven, with remote squirm control and laser spotwelding capability. You *must* have some of *those* in stock!"

Yaffa Varian, the grizzled Grynth proprietor of the Thriftex Part Mart, shrugged expansively. "I agree we should. But there was a cargo strike on Godzilla II, and then there were magnetic storms in McGonagall Sector, and the shipment's impounded on Ballantrae."

"Ballantrae? The excisemen there are the biggest sticklers for regulations this side of the Magellanic Clouds! You'll *never* get them out again!"

The Grynth shrugged again. "You could well be right," he sighed. "I've put in a replacement order, but there's a six-month backlog."

The joat groaned, and swore an ancient but still potent oath. A good oath, like a fine wine, matures with age. "Look," he said, "I've got a contract to service a dozen fusion baffles for Deneb Mercantiles, and I need that equipment." He waved a hand at the racks of gadgetry; the festooned tubes, wires, and polycompatible connectors; the dumpy plastic crates of heavy machinery; the shelves of universal componentry in colour-coded boxes. "You must have *something* that will do the job."

Varian pursed his lips, giving the appearance of thought. Billy knew that within his brain was an accurate list of every item in stock, instantly accessible: Yaffa was sizing up the angles. "I've got a size nine without remotes," he said finally. "You could probably cannibalize a B7-c borer for those, and spotweld with an arc instead of a laser."

"That's 'ark' as in Noah?" said Billy sarcastically. "I'd need three hands with equipment as obsolete as that."

"Well," said the Grynth, "I *could* lend you an autolimb."

The joat tugged at one ear. "Those things are expensive to rent," he stated.

"I have . . . shall we say, *unusual* sources."

"Sure," said Billy. "This job'll take three times as long as it should, and be five times as tricky. Fortunately," he went on modestly, "I'm an autolimb virtuoso and I can handle it. How much?"

"The equipment? Same as a size seven 'runner plus attachments, since that was what you wanted."

"No," said Billy, "the autolimb."

"Free of charge."

"Rubbish!"

Another shrug. "Of course, as a reciprocal gesture of friendship, I'd appreciate the purchase of one of these fine sound-microscopes . . ."

Billy the joat's reply was drowned out—though his gesture, hardly one of friendship, was not—by an amazing noise. It began as a high-pitched whine, growing in seconds from the level of a swamp-skeeter in April to that of a six-bore quartz drill encountering a flint obstruction; it sashayed into an irregular grinding

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sound terminated by a rapid burst of three whiplash cracks; and it ended in a bone-jarring rumble that vibrated mud and raft like a blancmange in rut, shaking the building to its baseboards and causing a fine dust to drift down from the ceiling, filling the air with its particles. It faded slowly.

Joat and junk-merchant gathered their wits. "What was it?" enquired the Grynth.

"If we were on one of the wargame worlds in Rim country," said Billy, "I'd guess at a Q-class battlecruiser on a bombing run. But," he added, "since this is Grover's World, the only thing I can imagine is a Mitsui Mark VIII sportsyacht with phasefringe boosters making a supersonic approach. And that's stupid," he went on, "because it's illegal, and the only people who own Mitsuis are ambassadors' daughters, football players, sensorium stars, and politicians . . . and none of them would want to come within thirty light-years."

But it *was* a Mitsui. And its owners were *just* the type of people who would have one.

". . . and they've bought half a dozen raft blocks over by Shumly Marsh," added Mary, finishing a lengthy account of the newcomers' activities as gleaned from the offices of Bell-Galactic Telephones Inc. "Right on the edge of the Brixton slums. I can't understand why they chose it."

Wyllam (Billy the joat) Jarneyvore explained. "It's right in character for an Etonian Family," he said. "They want contrast. They go in for ostentatious wealth, shown up to greatest effect."

"On *Grover's World?*"

"Yes, that *is* perplexing. Though we hardly lack money, thanks to the chemicals in our ubiquitous mud."

"It's about all we *don't* lack," said Mary. "We don't even have freewave."

"They'll be rich enough to bring in anything they want," said Billy, "including miniaturized phasehopper caskets to send messages. But it is a bit ironic."

"In what way?"

"It all goes back to Rudolph Eton," said Billy, "and he *invented* freewave. You can imagine what the revenue was before the patents lapsed. The money went to his head, it seems, and he thought he would found a dynasty or something. And he set it all up so that his descendants had to be not only wealthy, but *conspicuously* wealthy. The income is still enormous, of course: he diversified. They must have a hard time spending it."

"I could offer to help," said Mary. "But even so—why come *here* of all places?"

"For that matter," said the joat, "why did we let them? They always cause trouble."

Twelve rafts to the South and four East, and twenty minutes earlier, Joze Palgandra had asked the same question. As local SpaDe official he was in a position to obtain an answer.

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Which he did not like.

"So we can't kick them out," he snarled at his Third Secretary.

"No, sir. They've acquired a controlling interest in Consolidated Sludge. And ConSludge has a twenty-year franchise to filter organic macromolecules from the mud."

"But even so," said Palgandra, "I don't see why they had to *come* here. They could have set up a holding company."

"Unfortunately not, sir. There's a new Quaternity edict—a copy is on your desk, sir—dealing with the exploitation of scarce resources. It's restricted to local companies, where 'local' is defined by a criterion of domicile."

"You mean they have to live here," said Palgandra. The other nodded mutely. Palgandra gestured out of the window. Brown and green slime spread endlessly to the horizon, under a brooding orange sky. "You call *that* scarce?"

"No, sir, not by planetary standards. But by sector criteria, some of the organics are very scarce. Especially kata-chelated-dibenzopoly-2'-phenyloxylazophospholine-22."

"Good gods," said Palgandra. "What's that?"

"Damned if I know, sir."

The Etonians lost no time transforming Brixton. A fleet of tenders followed hard on their heels, crammed to the phase-coils with equipment and possessions (the latter a requirement to satisfy domicile criteria). Existing buildings on the newly purchased rafts were demolished, and a Barasshanti company skilled in high-speed construction moved in. Elegant, slender towers sprouted skywards, encircled by spiral walkways and exotic gardens in artificial environment pods; fragile arches spanned the channels of slime that separated the rafts; squat domes housing communication equipment and power supplies proliferated like measles.

An open area at the very center was the subject of intense activity. Elliptical in shape, a hundred meters by fifty, it had been levelled completely. A deep permacrete-lined shaft was sunk by a squad of Femm technicians who departed as quietly and suddenly as they had appeared; only to reappear a fortnight later with an immense hovertransport, which positioned itself above the shaft while a large featureless oval capsule was installed. After that everything was obscured by scaffolding and plastic sheeting for a while. When these came down, they revealed an opulent structure whose design resembled a Femm brood-palace from the Reductionist period, but executed entirely in glass. The external rooms were faced with flat, transparent panels. Within were displayed jewels; valuable paintings, sculptures, holograving; precious metals and scarce minerals; cabinets of rare perfumery and spices; ancient books and tapes; antique furniture; hand-crafted carpets from Shiraz IV —even a collection of Grynth

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mosaics. True to form, the Etonians made no effort whatsoever to conceal their wealth.

Chief Constable Otis Pigge shook his heavy jowls incredulously. Such a display, on the fringe of such a disreputable area, represented an irresistible challenge to every crook on planet. Pigge prophecied that within two days there would be nothing left but an empty glass shell.

Yet, a month later, the contents were more opulent than ever, and not a single item had vanished. Pigge was confounded, and the underworld was frustrated: the building seemed impenetrable. The glass—if glass it were—was unbreakable; there were no locks to pick; and submersible toves encountered an invisible barrier in the murky depths beneath the raft. When in desperation one offworld criminal brought up a battery of laser cannon, the beam ricochetted back off the glass and wrecked his projector. The event was sufficiently unusual to attract the news media, and the aspiring thief was interviewed several days later in his hospital bed.

"They've set up an Inflex screen," said Billy the joat, addressing the blue cow on his mug of coffee, having noticed the headline. He distractedly leaned his left elbow on a slice of toast, thickly spread with three-fruit marmalade, as he thought the implications through.

"They've set up an Inflex screen," stated Chief Constable Pigge in horror. "I want it shut off immediately. Get me a court order!"

"They've set up an Inflex screen," said the Second Undersecretary to Joze Palgandra. "Big Pig—I mean, Chief Constable Pigge—has tried to get it shut off again, but the Etonians appear to have obtained approval for it from Quaternity Central."

"That's surprising," said Palgandra. "Those things generate undesirable pollutants in a planetary atmosphere." He pinched his nose. "They *smell,* Worthington. They smell *dreadful.*"

"QuatCent says that this one has a newly developed suppressor system, sir."

Palgandra was skeptical. "And has this *newly developed suppressor been field-tested*?"

"I gather we *are* the field-test, sir."

At first it seemed to work. But slowly a nauseating smell began to build in the immediate vicinity of the screen. After a time, gaping visitors on nearby rafts began to sniff uncertainly. Soon faint emanations could be detected a kilometer away.

It is an unfortunate characteristic of Inflex screens that the odors they generate cannot penetrate the screen itself. The Etonians could ignore the problem they were causing. In fact they rather enjoyed it: it suited their abrasive personalities and heightened the contrast between their lifestyle and that of the remainder of Grover's World.

Yaffa Varian placed an order for a quarter of a million noseplugs, sale-

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or-return.

Quaternity Central unaccountably refused to revoke the approval for the screen.

Chief Constable Pigge fumed.

And then he received an unexpected phone call from . . . Eshelby Eton VI. Who had been robbed of several dozen priceless artifacts.

Constable Pigge had dreamed of this moment. He could scarcely believe that fortune had so smiled on him.

When he checked with his superiors on Aphélix he discovered it hadn't.

"You mean," said Palgandra, "that we not only have to put up with these people, but we have to assist them?"

"Actively," said a subdued Pigge. "We must—quote—leave no stone unturned—unquote. And fast, or we're *both* out on our necks. It stinks —metaphorically as well as literally."

Palgandra paced the carpet, thinking fast. Situations such as these had occurred before in his career, but not at his present high level. "That's crazy," he said. "I can't imagine how they could have that much pull in Quaternity Central. They must have something we don't know about."

The Chief nodded. "They do," he said. "Katch-22."

"Eh?"

"Kata-chelated dibenzo-something-or-other 22."

"Ah—I remember. Dibenzopoly-2'-phenyloxylazophospholine."

The Chief brightened. "You've heard of it, then?"

"Oh, yes," said Palgandra. "I've heard of it. The Etonians have cornered the market in it.

"Though I have no idea what it does."

He paced the floor at an accelerated rate. "This is a very *singular* problem," he said, "and it needs a very *singular* person to solve it."

Pigge grunted "I presume you have someone in mind?"

"I do indeed," said Palgandra with a sigh. "You recall the affair of the vanished trapcode and the directory computer?"

"How could I forget?" said Pigge. "It is indelibly linked in my memory to another incident, involving a police tove and the Eros raft. But," he added, "I suppose that doesn't count in such desperate straits."

"No, it doesn't," said Palgandra. His mouth twisted in a grimace of pain and resignation. "He's the only choice."

"I confess," said Pigge, "I agree. These Etonians," said Pigge, "are even worse," he continued, "than Billy the joat."

"That's a tough brief," said the joat. "Find out who cracked a tamper-proof Inflex screen, and how. Locate the missing objects. Satisfy QuatCent that this has been done to the Etonians' satisfaction. The Etonians will then be so eternally grateful that they will switch the screen off before the smell renders Grover's World uninhabitable, incidentally removing all protection from their incredible hoard of valuables. Better

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still, they will cheerfully move off planet, and lose their franchise to filter Katch-22."

"You can do it," said Palgandra. The joat bowed elaborately.

"Your wish is my command," he said. "I'll need an open-ended contract: five hundred a day plus all reasonable expenses." This was agreed upon.

As Billy went out, he tripped over the wastebasket. He aimed a kick at it.

He missed.

A joat—Jack-Of-All-Trades—is a man with a finger in many pies. And,by nature, a pie in many faces. He has an eidetic memory, a knack with machinery, and a gift for improvisation. He can build up a broad picture from sketchy information, and manoeuvre with a sure touch in a situation he does not fully understand. His skills range from linguistic dexterity to quark-engineering, from entomology to programming. In a universe of specialists he lubricates the industrial and bureaucratic machinery —often against its own wishes. In a universe where status is granted according to specialities, he is an individualist who cooperates only grudgingly with authority, and he *never* imagines that it can apply to himself. Authority comes to terms with him only because he gets results.

Wyllam Jarneyvore was a craftsman among joats, with a personality to match.

His first step was to put out feelers among the less desirable elements of Grover's World society—the petty criminals and informers. As Chief Pigge, in his cups, had eloquently put it: the congealed skin of the underworld porridge. Pigge, in a show put on for the benefit of QuatCent, did much the same. Unusually, neither of them got any results.

The underworld, thought Billy, *knows nothing about it. By inference, they had nothing to do with it. Which implies offworlders or amateurs.* The most tempting suspects, the construction crews, he ruled out immediately: they had all left the planet before the crime was committed. *Though that need not prove anything,* he thought, provisionally ruling them back in again. *A construction worker might have concealed a robot within the screen, programmed to depolarize the generator and decamp with the goodies. Or left a timer to do the depolarizing, with a robot or a living accomplice working from the outside. And what about a self-erasing parasite in the program for the automatics? Or. . .*

On thinking about it, there were so many possibilities that the security-minded Etonians must have done something to prevent any such tricks.

Surely.

Billy reached for the phone.

Five minutes later he put it back down, having acquired a grudging admiration for Chief Constable Pigge. Pigge had had similar thoughts, and run a few checks.

The Etonians had put all of the construction workers under mindbind-

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ing. A kind of hypnosis, which restrained its subject from specified actions while leaving his faculties otherwise unimpaired. *At fifty thousand apiece,* thought Billy, *security doesn't come cheap. But then, the Etonians don't think about money the way most of us do.*

They should have mindbound the whole damned planet.

But even the Etonians' wealth would hardly stretch that far . . .and in any case mindbinding was a voluntary process only. The joat wondered briefly if someone had found a way around mindbinding: then discarded the thought. Anyone that clever would never be caught anyway.

He ruled the construction crew out again.

On Katch-22 he had more success. According to persistent rumour, the substance was involved in the production of a carcinosuppressant drug, much valued on the central worlds by aging diplomats and officials. (It would have been much valued elsewhere, but the supply was restricted.) This explained the Etonians' influence. The catch was, he noted, that this influence vanished the moment they left the planet, along with their franchise. Which was a fascinating thought. Katch-22 indeed.

Billy set the library to work digging up literature on Inflex screens and related topics, and went to interview the Etonians.

They wouldn't let him in.

They wouldn't let anyone in. The Inflex screen was programmed to depolarize only for the members of the household. If they wished to talk to visitors they received them on one of the adjoining rafts. They were totally paranoid about letting anyone into the main building itself. Look, but don't touch.

Billy pointed out that this made his investigations difficult, but the argument cut no ice. In the end he settled for a telephone interview, which was unsatisfactory since he had hoped to get a closer look at the inside rooms of the house, hidden from public view. The Etonians displayed their possessions, but preferred privacy for themselves. The contradictions in their psychology fascinated him.

Sherryl Eton condescended to talk to him. He asked a few routine questions. She had already furnished a list of the stolen goods to Constable Pigge: he could obtain a copy by phone if he wished. No, they had no idea who might have had access to the building. It should not have been possible.

"Do you know of any way," asked Billy, "to penetrate an Inflex screen? Could someone have interfered with your household robots using a radio beam, or a laser, or something like that?"

Instead of answering, she stood up, and walked into an adjoining room. The phone, presumably held by a robot attendant, followed. Billy watched on the screen. The room was windowless, with a soft artificial light. One wall was a featureless plane surface, and it was black. "An Inflex screen," she

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said, "from the inside. It lets light out, but it lets *nothing* in. No radiation of any kind. No solid matter. No particle beams. Not even freewave solitons." She touched a switch, and the surface cleared. Through it Billy could see parklands, and beyond them the city. Birds sang in bushes, and distantly he heard the mournful honking cacophony of a draggle of mudlarks. "Partial polarization," she said, "for visible light. Like this, a laser beam might enter." She pressed the switch again and the blackness returned. "We keep it like this. That demonstration is the first time I have used this switch. And the same goes for everyone else."

"You're creating an awful smell with that screen," said Billy.

"We have permission," she said. "It does seem to drive the tourists away. Funny thing," she added, "the birds don't seem to mind." They listened for a moment to the twittering. "Perhaps they don't have a sense of smell," she said.

Palgandra was unimpressed. "It's not very much, Jarneyvore," he said. "Constable Pigge got most of the information first anyway, and all you seem to have done is to confirm that the crime was impossible."

"I did find out what Katch-22 was used for," the joat reminded him.

"I suppose so," said Palgandra

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grudgingly, after a long pause.

Billy rose to his feet and sidestepped past the wastebasket. "I'm doing my best, Mr. Palgandra, and we're not licked yet. By tomorrow I'll know as much about Inflex screens as their inventor. More, actually—I'll know what was discovered afterwards too. Something has to turn up. Somebody cracked that screen, and if they can do it, I can."

Palgandra nodded glumly.

Billy's researches into Inflex screens mostly confirmed what he knew already. The mechanism that generated the field was of Femm origin; and while a little strange (as was everything Femmish) it was based on standard physical principles. The generator was customarily housed in a sealed unit with its own power-plant, and it required heavy lifting equipment and portable neutron shielding to make any adjustments to it.

The screen itself was a gravitic singularity: a delocalized black hole which produced a gravitational field only along its own surface. It thereby created a barrier which was totally impervious to any form of radiation or matter. It functioned like an infinitely thin pseudo-rigid shell—and in fact much of the engineering theory treated it as rigid. It could be marginally polarized to permit the entry or exit of a band of electromagnetic radiation—light, or radio waves—by a subsidiary mechanism which altered the surface gravity field. It could be fully depolarized, to permit entry and exit of material objects (such as the Etonians and their money), and the associated security systems appeared completely watertight: Billy doubted that the machinery itself offered any interesting possibilities, although access to the controls was a different matter. But that, again, required some kind of penetration of the field.

A spherical gravity field must itself have secondary singularities, for topological reasons—it is impossible to comb a hairy ball smooth (which is why dogs have partings along their tummies), and if there could exist a gravity field on a sphere without singularities it would be possible to comb the ball along the force-lines of the field. At one of these secondary singularities the curvature of the tangential field is theoretically infinite, practically very large (the theory breaks down in detail). Localized pressure under twisted conditions tied up innocuous nitrogen, carbon dioxide, and water into complicated organic knots: ketones, isocyanides, hydrazines—none of which would have won any prizes in a perfume competition—and, given the odd sulphur atom, it was possible to form mercaptans, which were even worse.

Nowhere in the literature could the library find any method to penetrate or shut down an Inflex screen from the outside.

Sherlock Holmes had a principle for it. *When you have eliminated the impossible, whatever remains, however improbable, must be the truth.* The joat was an avid reader of old

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detective stories, and had a soft spot for the deerstalker-capped pipesmoking monomaniac, with his cocaine habit—funny how times change—even if most of his triumphs did hinge upon criminals scattering clues about the countryside like hares in a paperchase. If an outside job was impossible, could it have been an *inside* job?

Who *was* inside?

A multitude of Etons. It was hard to see any motive. The value of the missing goods was insignificant compared to their total wealth, which tended to rule out fraud. No, it didn't fit. Joats develop a strong intuition, and Billy's told him that the Etons were not involved.

Servants? The Etons had none. Only robots.

Now that was a thought. Robots. Could the crime have been committed by a *robot*? That really was ridiculous, because a robot could have no conceivable motive. Of course, an outsider could have subverted a robot's programming; but that put the problem back where it had been before, because an outsider could have no access to a robot.

And the Etons never allowed visitors within the screen.

What do I do, Sherlock, when it looks as if everything *is impossible?*

Billy considered another possibility. Perhaps some item of equipment, some valuable artifact, owned by the Etons was not what it appeared to be. For example, an autonomous robot, capable of shutting off the screen temporarily. Though that was a little far-fetched, because they would surely have security snoops to inspect everything they bought or were given. However, that was at least a potential weak link. If there *was* anything of that nature, it would have to be something acquired since they arrived on Grovers World. That event had surprised everybody, and Billy doubted that longer range plans were likely.

Failing that, it must be outsiders. If you could have transmitted a radio beam through the field it would have been relatively simple to subvert the program of one of the lower echelon robots—say a cleaner—because these were conventional models with radio-directed supervisory programs. You'd need a few codes, of course, but Billy could have laid hands on those himself. But radio would not penetrate an Inflex screen.

He called Chief Pigge. To the Chief's credit, he had already thought of the possibility of automatic machinery infiltrated under some other guise, and had obtained from the Etons a list of their Grover's World purchases. It wasn't very long—clearly Grover's World had little to offer—and included a few artworks, with Quaternity certificates of authenticity which would be hard to fake; together with a few mineral specimens purchased from, of all places, the Thriftex Part Mart. Among these the only unusual one seemed to be a large cluster of gemstones of Femm origin, known as ppholery. The joat looked the word

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up in his Femm-Galaxic dictionary, but found only the words pphol, meaning "shine," and llery, meaning "howl." *Shinehowl*? It didn't make much sense.

However, thought of the Thriftex Part Mart reminded the joat of Yaffa Varian. Varian, in his own area, was a somewhat erratic minijoat. His trade required an unorthodox mixture of abilities. In technological matters his knowledge was unparalleled for its breadth, though its depths were fraught with reefs and sandbars which could easily cause a wreck.

And even the great Holmes sometimes had to consult his brother Mycroft.

"Pphollery?" said Varian. "Very rare stuff. I picked up a lump from a prospector who was down on his luck and had some . . . awkward . . . problems that he had to deal with rather quickly."

"Why didn't he sell it to the Mining Department?"

"That was related to the awkward bit. I'd really prefer not to go into any details."

"It seems to translate as 'shine-howl,'" said Billy. "Is that right?"

"Pretty close," said Varian. "It's a very weird stone, a bit like a piezoelectric crystal, but with a twist. If you shine a laser on it, it sets up some kind of molecular vibration, and the whole stone gives off a piercing whistle."

"Pity," said Billy. "Lasers don't penetrate Inflex screens. Do you know anything that does?"

"Sure," said Varian.

The joat's ears pricked up. "What?"

"Gravity," said Varian.

That's true. Sherryl Eton didn't float on the ceiling. "I see," said Billy. "So, provided the thief found some way to make use of it, he could get through the screen with a portable gravity generator."

He paused. "Pity nobody has any idea how to make one." He paused again. "Anything else?"

"Not that I know of," said Varian.

Fine brother Mycroft you make. Oh well. The joat grabbed his jacket from the chair on which it had been hung and put it back on. "Thanks anyway. Let me know if you do think of anything. And," he said, "if there's anything I can do in return, just say the word."

This proved a mistake. Twenty minutes later, when he emerged, it was with a sound-microscope tucked under one arm.

From the university he borrowed a small piece of pphollery, and took it home with him. He shone a laser on it but it didn't seem to do anything. Wrong wavelength? Not large enough? He gave up, and spent an hour studying the equations for an Inflex screen, until he understood how the spherical zone was thrown off from a point singularity when the power increased beyond a threshold. Minor changes modified it to give an ellipsoid, which was what the Etonians seemed to be using. There were some interesting instabilities that

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could occur then, including secondary thresholds and multiple zones acting rather like higher harmonics of a sound wave, but he reluctantly pushed those ideas aside since they had little bearing on the problem at hand. Lacking anything else to do, he played with his new toy, the sound-microscope.

Unlike an optical microscope, it used pulses of ultrasound to "illuminate" an object. The definition was relatively clear, because the frequency of sound was very high; but sound waves could penetrate where light could not, and different tissues reacted differently to sound waves, compared to light. He put the piece of ppholery into the specimen area: it looked very pretty but otherwise suggested nothing. Bored, he switched on the video but got nothing except static: perhaps Basketball was giving out flares again. He switched off both video and microscope and went to bed.

The mudlarks outside kept him awake for an hour with their croaking. When he finally did sleep it was an uneasy slumber, punctuated by dreams of Inflex screens, sound-microscopes, ppholery, and mudlarks. At one point two mudlarks were studying Sherryl Eton through a sound-microscope, and getting echoes . . .

. . . and Billy was suddenly wide awake.

He switched the video back on.

". . . *brought to you by the manufacturers of OCTRAPOD, the mild abrasive that keeps your tentaclaws SMOOTH and SHINY. And now for the latest multigram from Kryzzella Werralu, a snappy number called* . . ." The announcer's voice was obliterated by a burst of static as Billy switched the sound-microscope on. When he turned it off again, the discordant tune returned.

Billy had discovered the *modus operandi* . . . and the criminal. The next step should have been to locate the missing goods, but Billy could guess the answer to that. The urgent problem was to persuade the Etonians to move off planet; and Billy's fertile mind had some ideas about that, too. Those multiple zone harmonics he had discovered might prove useful . . .

He needed some help, and it was obvious who to ask.

After all, Yaffa Varian had a vested interest in keeping out of jail.

Three days passed. On the morning of the third, Palgandra received a cryptic phone message, commandeered a tove, and sped towards Brixton in a spray of mud. Even before he arrived, he could tell that something was afoot.

The smell wasn't so bad.

And when he got closer, he could see that something was terribly amiss with the Inflex screen.

It had gone black.

And it was surrounded by Femm transports.

And the workers were wearing oxygen masks.

And they were loading crates as fast as they could shift them.

"Sharraby Breach!" breathed Palgandra, who controlled his

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language even under stress. "They're leaving!"

"All right," said Palgandra. "Let's have it."

Billy looked at Varian, who said, "Sure, tell him."

"I won't bother you with the train of thought involved in making the necessary deductions," said the joat, "although it would be very instructive and I'm sure it would do you a power of good. But we do have a few trade secrets to protect, as I'm sure you understand, and that means we have to . . ."

"Get on with it "

"The first breakthrough came when I realized that an Inflex screen, though impervious to matter and radiation, can transmit sound waves. It's just like a rigid surface, and it *vibrates.* I guess nobody had realized that because Inflex screens are only used in a vacuum, out in space, with no sound waves around. But really, I should have realized it when I heard those blasted mudlarks and birds when I was talking on the phone to Sherryl Eton."

"Mudlarks?" enquired Palgandra. The joat ignored him.

"Then I found out about the pphollery." He waited, but Palgandra made no attempt to interrupt. "It's a mineral that they had a lump of in one of the outer rooms. Yaffa here," he continued, rewriting history where it was beneficial to do so, "told me that that gives off radio waves when a beam of ultrasound hits it."

"Actually," said Varian, also rewriting history, "I told him that it gives off light when vibrated by sound waves. That's what pphollery means: pphol means 'shine' and llery means 'whistle.' The Femm play tunes to it and watch it twinkle."

"But," said the joat, "by Rozby's Reciprocal Relationship, that means that high-frequency sound should generate radio waves. So, if a thief focuses a modulated beam of ultrasound *through* the Inflex screen on to the pphollery—he can generate radio messages. And those can be used to subvert the cleaning robots."

"And they shut down the screen to let the thieves in?"

"No, they don't have that option. There's an alarm circuit, of course. What they did was more interesting. They got the robots to *hide* the goods inside the house. To *simulate* a theft."

"But," said Palgandra, "the Etonians searched the whole house and found nothing."

"The Etonians," said Billy, "don't lift a damned finger themselves. The robots searched the house. The program subversion was subtle enough to keep them away from wherever the stuff was hidden."

Palgandra had another objection. "But why *fake* a robbery?"

Varian spoke up. "If you lived near Brixton," he said, "you wouldn't have to ask that. Anything that had even a chance of putting pressure on them to move would be worth trying."

"But how," asked Palgandra, "did the thieves think of the method to

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begin with?"

"I'd guess," said Billy, "that they spotted the lump of pphollery through a window, recognized what it could be made to do . . . and did it." He turned to Varian. "Isn't that right?"

"Oh, yes," said Varian. "I'm *sure* that must be what they did."

Constable Pigge still looked worried. "Who was it, that's what I want to know," he said. "I don't *want* to arrest anyone for being public-spirited, but . . ."

"Worry not, Mr. Pigge," said the joat. "No theft . . . no crime."

"Oh," said Pigge.

"Well," said Varian, "you could probably think up *some* charges. Attempted robbery—"

"Wouldn't stick," said Pigge determinedly. "Funny," he said, "but I can't think of a *thing* that would, right now."

Palgandra interrupted, annoyed by the smug look on both their faces. "We still haven't heard why they left."

Billy smiled. "Amazing coincidence, that. Their screen went supercritical on them. It's a nasty effect, because it reverses polarity on the surface of the screen. Guess what that does to the smell."

Silence.

"Traps it *inside*," said Billy. "It doesn't actually trap the Etonians, unfortunately . . . well, in a way, fortunately . . . because their equipment that depolarizes the screen for entrances and exits still functions. Partially. But the associated security system is moderately paranoid, and it won't allow permanent depolarization; so they can't install any kind of extraction devices. Too much of a weak point in their defences."

"Oh, surely," said Palgandra, "they could find a way of dealing with the smell by depolarizing the screen at intervals?"

"Given time, perhaps," said Billy. "But until they get it working, the smell persists. And it's very penetrating, as we all know. Don't forget, these people are the *idle* rich. Discomfort, even if temporary, is not something they're used to."

"They could move out. That would give them time."

"But only to somewhere else on planet," said Billy. "Domicile criteria, right?"

"And it's not just their *valuables* they need to protect," said Varian, making a chopping motion with one hand.

"For the same reason, they can't switch the generator off," said Billy. "Actually," he added smugly, "that's rather an academic point in any case."

"What's that supposed to mean?"

"It's what makes it fortunate—for the Etonians—that their entrances and exits still function. When it goes supercritical, the generator also throws off a second, tiny screen; inside the first one. Fits fairly snugly round the generator. And *that* one isn't fitted with depolarization circuits, like the main one is."

The Chief Constable laughed delightedly. "You mean to say they're stuck with a screen they can't turn off

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that contains the generator, while the smell builds up *inside* the outer screen? Oh boy, that's rich!"

"*Very* rich," said Varian "It concentrates in small spaces, too." They all laughed.

"Do you happen to know," asked Palgandra, "what can set up this kind of supercritical instability?"

"Naturally," said Varian. "Ultrasound again. It all fits rather beautifully."

"Can it be switched off?" asked Palgandra. "It's a nuisance if it has to stay where it is. It might blow up or something."

"It's safe enough," said Billy. "But you can easily tow it out into space, or fire it into the surface of Basketball or some such thing."

"They could have just moved somewhere else on planet," said Palgandra.

"I think," said the joat, "that they had reason to believe that the same thing would happen every time they set up an Inflex screen." *They had reason, all right: I sent them a message to say so.* "Now, they can't protect that much wealth without a screen; but they can't own ConSludge unless they live here . . . and that means they have to keep eighty percent of their possessions here, by Quaternity edict.

"And that's too much risk, so they had to cut their losses and leave."

"Which means that shares in ConSludge must be up for grabs," said Varian.

After which Palgandra seemed in a hurry to close the meeting.

Rapidly he dialled—not SpaDe HQ, but his stockbroker.

"Murgeon and Caulicrumb here."

"Put Murgeon on, please. Thanks.

"Good afternoon, this is Palgandra. I want to buy shares in Consolidated Sludge."

"I'm sorry, Mr. Palgandra, but you're too late. The entire issue has been purchased by a holding company set up by the Bank of Betelguese."

"What!"

Bolidas Murgeon sounded apologetic. "Apparently someone tipped off the bank, and in exchange the bank financed the company. They'd have to have some local people on the board, you see, because of the domicile criteria."

"And who are these locals?"

"I haven't been able to find out," said Murgeon. "BB is a rather tightly-knit organization.

"The local firm is called The Natural Organic Sediment Extraction Holding Company, if that helps."

"Not really," said Palgandra.

But he began to develop horrible suspicions. And then the Natural Organic Sediment Extraction Holding Company marketed a new smell-proofed Inflex screen for planetary use. It generated the screen in a thin, double-layered sandwich that confined the smell between the two layers. And everything began to fall into place. The final confirmation was when he realized . . .

. . .that the N.O.S.E.-Holding Company could have been named only by Billy the Joat. ■

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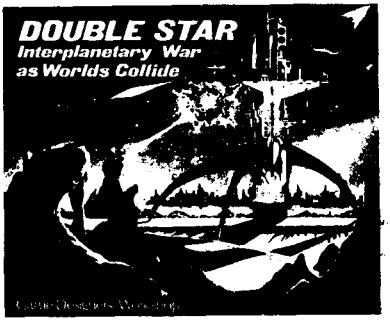

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SNAPSHOT— As the small free trader *Beowulf* jumps between the stars, one of the passengers secretly assembles a concealed pistol, and slowly works his way to the bridge. Just as the hijacking begins, the computer kicks in: doors slam shut and seal off the ship's vital areas. This time, the hijacking is foiled. *Next time?* **Snapshot** is a game of close combat — be it hijacking, mutiny, or boarding parties — aboard the starships of the far future. All manner of weapons and all types of individuals are included, as well as detailed starship plans. Boxed, $7.98.

IMPERIUM— The Terran Confederation, having expanded beyond the solar system to the near stars, has encountered an immense interstellar empire, the **Imperium**, which now actively resists Terran expansion. The game begins with the first war between these forces. Each game continues where the last war left off, drawing and redrawing the Imperial borders, until one side has been swept from the board. Voted *Best New Game of 1977.* Boxed, $9.98.

All above science-fiction games are boxed, and each contains a game map showing the location in contention, die-cut counters to represent ships, people, forces and equipment, and rules governing play. **Traveller** contains three 48 page rules booklets only. For more information on these and other GDW science-fiction games, write for our free SF flyer. All of these games are available through hobby and game shops, or direct (and postpaid in the US and Canada) from

GDW

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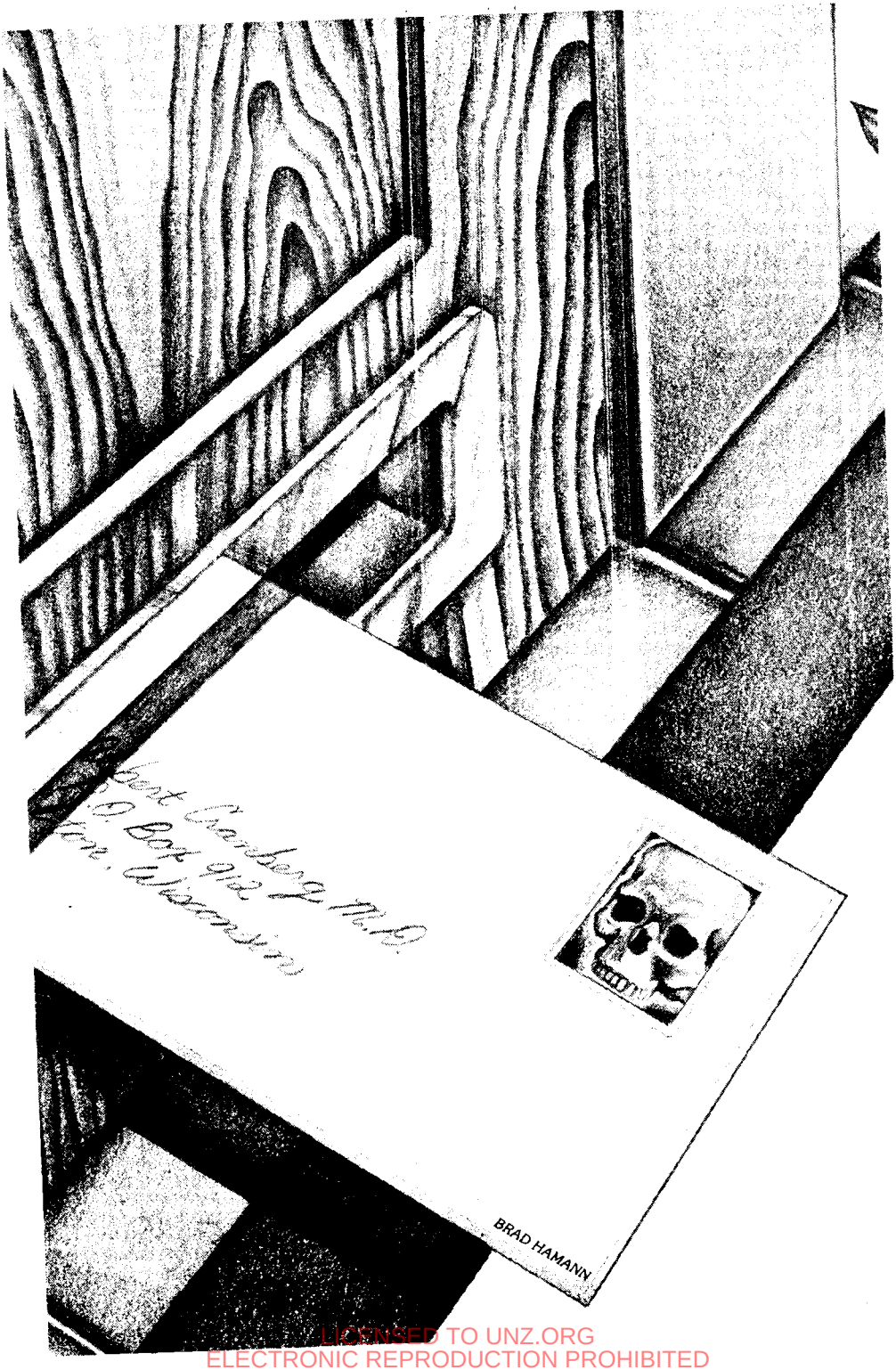

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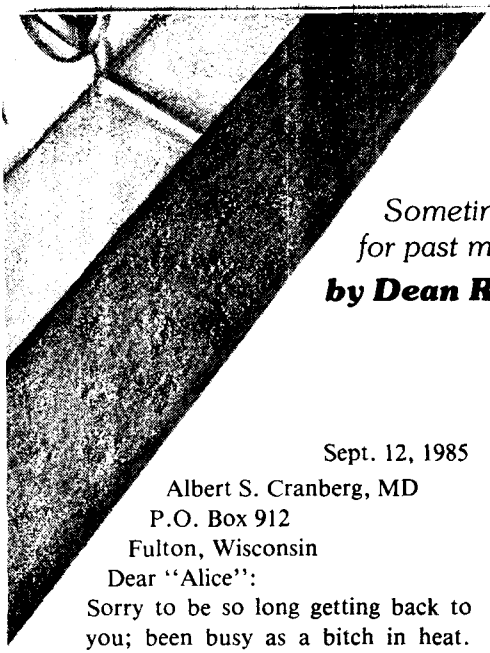


Sometimes you can make amends for past mistakes. Sometimes. . .

by Dean R. Lambe

Damn Shame

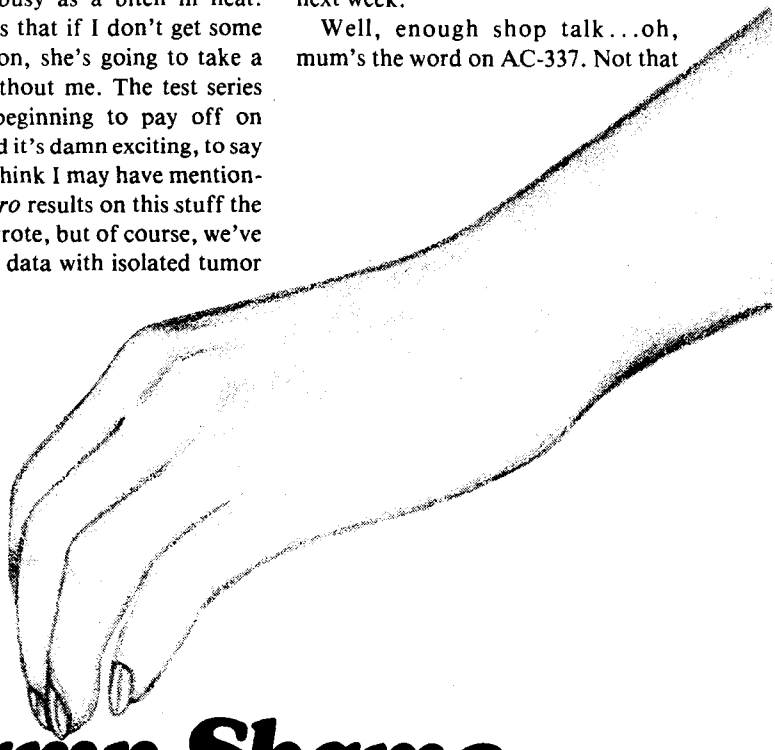
Sept. 12, 1985

Albert S. Cranberg, MD
P.O. Box 912
Fulton, Wisconsin

Dear "Alice":

Sorry to be so long getting back to you; been busy as a bitch in heat. Janet swears that if I don't get some time off soon, she's going to take a vacation without me. The test series are really beginning to pay off on AC-337, and it's damn exciting, to say the least! I think I may have mentioned the *in vitro* results on this stuff the last time I wrote, but of course, we've seen terrific data with isolated tumor cells before. Now that we've finished the first round of animal trials and toxicity screens, though, AC-337 is beginning to look like a winner. Why, in the Bh/286 mice alone (they're the little buggers with a handy gene for bladder cancer), we've got a 92% remission rate, and no gastrointestinal side-effects at all. You'd better believe that I'm anxious to start the dog trials next week.

Well, enough shop talk...oh, mum's the word on AC-337. Not that



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you would say anything, I'm sure, but Hendricks would have my fair young hide if premature publicity got out on our wonder drug. And you know how the press goes crazy about a "cancer cure."

So anyway, how're you doing out there in the sticks? Never could understand how you and Ruth keep from going crazy, but I guess you're right about small towns being the only sensible place to raise kids these days. Still going the GP route—golf on Wednesdays, poker on Saturday night? Just kidding, I remember how you used to play poker—old stone face, you ain't.

Wish I had more time, but gotta get back to the damn computer. Give my love to Ruth and your crumb crushers. Oh, and when you write, you'd better send it here to the lab. . . mail at home just seems to get lost in the shuffle.

All the best,
Fred

---

30 Sept 85

Frederick Jenssen, PhD
Ritter Memorial Institute
3944 Orangegrove Drive
Cloverdale, California
Dear Fred:

Will you for christsake quit calling me "Alice"! You'd think that we were still back in the damn frat house. Speaking of which, did you see the class reunion picture in the latest alumni bulletin? Ho boy, George Riviere looks like he'll be completely bald before he's 40, and Ken Shikoku must have gained 20 kilos. I was also surprised to see that Willis Eisner is working on that Amazon Basin project—never figured that screwball for a Corps of Engineers type. Say though, if your California water-shortage gets any worse, maybe old Willis can ship you some; he must have plenty to spare these days.

The old alma ma is asking for more contributions again—I imagine you got a letter too. Ruth and I always give all we can; what with so many good private schools folding, I'd like to think that the place will still be there when my kids are ready.

Glad to hear that your work is going well. That AC-337 really sounds promising. I've sure got a lot of patients with the Big C who could use something better than what they're getting now, but I suppose your stuff will come too late for most of them, even if it pans out.

As for what's new at this end; well, not much as you suspected. Little Ruth broke her arm two weeks ago—green-stick fracture of the radius. She fell off that damn jet skater that she just had to have for her birthday. Kids! When my partner set it, she wouldn't let him put on a mnemoplastic cast. Insisted on the old-fashioned plaster kind. Said her friends couldn't write on a plastic one! Not much else I guess. Oh, Ruth says to tell Janet that she's welcome to move in with us when she gets tired of your workaholic ways.

Regards,
Al

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Nov. 21, 1985

Albert S. Cranberg, MD
P.O. Box 912
Fulton, Wisconsin

Dear Al:

The space between our letters gets longer and longer, and that's no way to treat the best man at my wedding (I'll never forgive you for that business with the ring, you bastard). The work keeps going super; AC-337 is starting to look like Nobel Prize material. It's all we can do to keep our mouths shut when we're off-campus, but we've got to play it tight until the FDA prelim for human trials is approved. The three runs in the beagles were go all the way; still better than 85% remission for both sarcomas and carcinomas of several varieties... damn stuff's almost too good to be true. Keep all your toes crossed for us.

Believe it or not, Jack hasn't been a dull boy. Janet and I took a long weekend in Vancouver a couple of weeks ago; much fun and frolic was had by all, and she says that she won't run off with that new stud in her office after all (she's joking...uh, I think).

All the best,
Fred

---

3 Jan 86

Frederick Jenssen, PhD
Ritter Memorial Institute
3944 Orangegrove Drive
Cloverdale, California

Dear Fred:

Happy New Year, you lucky dog. Wish you were here to help me shovel snow! You people must have forgotten what winter's like, but then, I don't envy your drought. At least we can flush our commodes here—if the pipes don't freeze; and we did get to spend the holidays with Ruth's folks in Florida.

Fred, old buddy, I have a rather unusual request...hell, I know I shouldn't even ask, but if your AC-337 is still looking good, could you possibly send me enough for two patients? Yah, I know, the FDA and six other piles of bureaucrats would shit bricks, but these patients have nothing to lose, believe me. One is a 41-year-old school teacher, but by no means an old maid. She's been bed-hopping for years, and has never been pregnant—makes a classic case for breast cancer, and she's got it in both barrels, and I'm pretty sure that it's metastasized to her brain. Naturally, she waited too long to come in, and I don't give her more than six months. The other case is a 17-year-old kid, who was a star basketball player until a couple of months ago. He's got myeloma in both tibias, and he and his parents wouldn't accept double amputation when taking his legs might have done some good. I'm sure that it'll be into the marrow of femur and pelvis in less than a year.

So what do you say, Fred? I know we'd be shaky legally, but who's to know except a couple of terminal patients. Besides, the Laetrile and marijuana precedents do give us some protection; and you'd gain valuable data probably years ahead of schedule. I'll understand if you don't think you can

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swing it, but think on it, huh?

Regards,
Al

Jan. 14, 1986

Albert S. Cranberg, MD
P.O. Box 912
Fulton, Wisconsin
Dear Al:

Your plea for your two patients really hit me between the eyes, pal; sometimes day-in, day-out lab work makes a guy forget what it's all about. A week ago, I'd have had to say no way, but the FDA prelim just came through, and the third baboon series came up roses too. Granted, we won't be able to start human trials until June, but Hendricks has put me in charge of the whole shooting match (look ma, a promotion). So between you, me, and a couple of dying folks, what's a little AC-337 between friends? I'm sending you a little package, which includes the computer projections on the human dose-response curve. Naturally, I'll expect you to keep meticulous records. Oh, and you may be interested to know that our biochem people finally have a handle on how it works. Seems AC-337 has characteristics of both methotrexate and urethane, but selectively hits the RNA of tumor cells more like the former. They're still puzzling over why the protein synthesis breaks down in so many seemingly different types of cancer cells though.

Sure glad I can say yes. And hey, you folks give some real thought about heading this way for a vacation this summer.

All the best,
Fred

---

12 April 86

Frederick Jenssen, PhD
Ritter Memorial Institute
3944 Orangegrove Drive
Cloverdale, California
Dear Fred:

Now look who's falling behind in letter-writing. And this has got to be a quick note. I just got the second lab workup on "our" two patients, and want to let you know right away. The first follow-up after I started AC-337 was inconclusive, so I didn't want to send you any false positives. Now...well, I can hardly believe my eyes as I hold these X-rays. If what I see continues, that school teacher will be back to the Three R's this fall, and the kid will be under the hoop with the best of them again. Naturally, my next question is can you spare any more of the stuff? Could save surgery for a couple other patients. Oh, and how tough is AC-377 to synthesize? Is it going to cost an arm and a leg (no pun intended) when it's finally released?

Regards,
Al

May 2, 1986

Albert S. Cranberg, MD
P.O. Box 912
Fulton, Wisconsin
Dear Al:

Damn mail gets slower every

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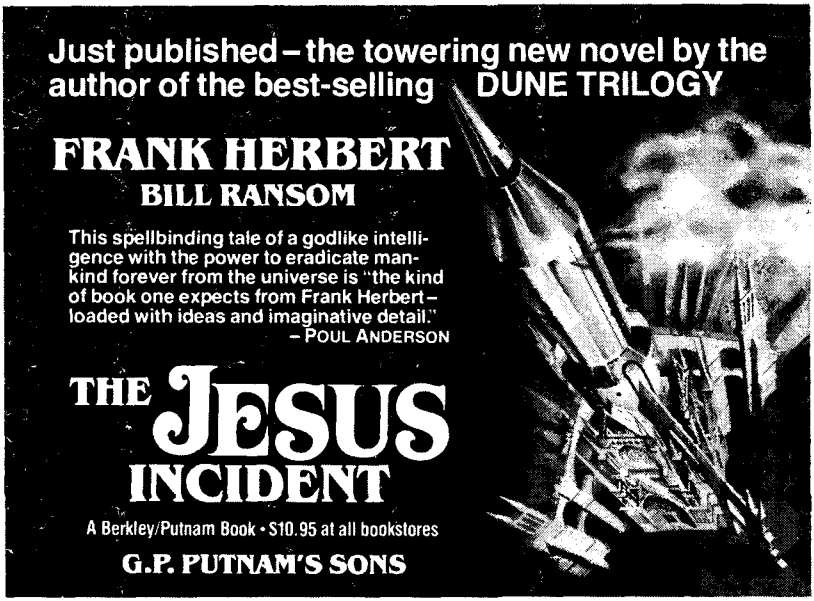
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month, but boy am I happy you're happy. And you'll be even happier to know that the baboons and chimps have shown no side-effects either; got three female baboons pregnant that had uterine cancer three months ago. How's that for a turn-around! As for synthesis of AC-337, well, the boys and girls in biochem say it'd be a bitch, but no sweat because the source is a botanical—some South American plant of all things (hell, I didn't even know that until a few days ago, and I'm supposed to be in charge).

Of course, it's too soon to have done a cost per dose projection at this time, and you know that our research costs certainly aren't cheap, but you sawbones shouldn't have to worry about the price.

I really wish I could send you more, but our human trials are about ready to go, and the available supply is all tightly budgeted. As a matter of fact, I have to break this off and get a subtle order out to the supply house for more raw materials (ah, the joys of being project director).

Do keep me informed on those patient's progress.

All the best,
Fred

May 2, 1986

Mr. Nathan Anderson
Butler Bio-Medical Supply, Inc.
521 Washburn Avenue
Lawrence, Kansas

Dear Mr. Anderson:

About a year ago, your company

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supplied us with 60 kilograms of dried specimens of the plant *Pedicularis tefensis.* You may recall that Dr. Carlton's team at the University of Kansas had found some indications of medicinal value in this South American plant. I am pleased to report that our research has confirmed Dr. Carlton's findings.

We are most anxious to continue our investigations with extracts from *Pedicularis tefensis,* and would like to order 400 kilograms for immediatae delivery.

Should your company be unable to supply this amount, I would appreciate any information you may have on other suppliers.

Sincerely,
Frederick Jenssen, PhD
Ritter Memorial Institute

May 28, 1986

Frederick Jenssen, PhD
Ritter Memorial Institute
3944 Orangegrove Drive
Cloverdale, California
Dear Dr. Jenssen:

I regret that we no longer have any stock of *Pedicularis tenfensis.* As you undoubtedly know, there has been considerable terrorist activity and increased anti-American sentiment in much of South America, and our regular field collectors are simply no longer welcome (or safe) in many areas. My contacts within our industry would indicate that other suppliers would be cut off from their former sources as well.

I am enclosing the name of a Brazilian botanist with whom we have had very good relations in the past, and I hope that he can be of help to you.

Please contact me if you feel that we can be of further service.

Yours truly,
Nate Anderson
Vice Pres., Botanicals
Butler Bio-Medical Supply, Inc.

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29 May 1986

Frederick Jenssen, PhD
Ritter Memorial Institute
3944 Orangegrove Drive
Cloverdale, California
Dear Fred:

Damnit, old buddy, this is literally one hell of a note! Classic "there's good news, and bad news." As for our two patients, well that's the good news —complete remission. You know we don't like to use the word, but if ever I've seen "cures," then that term applies to our schoolmarm and basketball player. Now for the irony— Ruth's got a lump in her left breast. Got the biopsy results yesterday, and I needn't tell you the verdict.

My ethics are shot to hell over this. I had one dose of AC-337 left, and you know what I did with it. But it won't be enough. . .please, Fred.

Please,
Al

June 12, 1986

Albert S. Cranberg, MD
P.O. Box 912
Fulton, Wisconsin
Dear Al:

Ethics be damned, friend! You

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know I'll find enough somewhere to give Ruth the full series. It's tight, what with all the protocols now on file with the Feds, but I think we're about to have a "computer error" here. I just ran into a little snag on the supply of raw materials, but I'm going directly to the source, so it's nothing for you or Ruth to worry about. We ought to have an ample amount in a couple of months, and I can easily replace what I send you.

Hang in there,
Fred

June 12, 1986

Senhor Dotor Joao Luis Linhares
Instituto Bot7anico Ocidental
27 Rua Barbacena
Manaus, Amazonas,
Brazil

Dear Dr. Linhares:

Mr. Nathan Anderson of Butler Bio-Medical Supply, Inc. has given me your name as one who might be able to supply extract from the plant *Pedicularis tefensis.* Our research has uncovered useful medicinal properties in this plant, and we are anxious to obtain several hundred kilograms in order to continue our investigations.

I would also appreciate any information that you may have on the possibility of controlled, hot-house cultivation of this species. If possible, I would like to arrange for the immediate shipment of several hundred living plants.

Sincerely,
Frederick Jenssen, PhD
Ritter Memorial Institute

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19 July 1986

Frederick Jenssen, PhD
Ritter Memorial Institute
3944 Orangegrove Drive
Cloverdale, California

Dear Dr. Jenssen:

I am in receipt of your letter to Dr. Joao Luis Linhares, and ask that you forgive my poor use of your language. I regret to inform you Dr. Linhares is not among the living, it being particularly saddening that the gentleman died at his own hand. Dr. Linhares put in most of his years in the study of the ecology of our tropical rain forest, and it is thought that he could not accept the necessity of flooding for to make our great Amazon Sea. It is unfortunate that this good man lacked the vision of our great Presidente for the progress and good of our peoples.

I also regret that I cannot supply you any *Pedicularis tefensis,* what you would call Tefé Lousewort. I do not know this plant personally, but with consultation of the notes of Dr. Linhares, I find that *Pedicularis tefensis* grows only at a place 50 km from where the River Tefé flows into the River Amazon. Now, with completion of our dams, that region is below many meters of water. It is assumed that this species is now extinct.

As I am convinced of your interest in our other plants of value medical, I take the liberty of sending you a listing of what is available.

Yours sincerely,
Raimundo P-M. Chavantes, DSc
Instituto Botânico Ocidental ■

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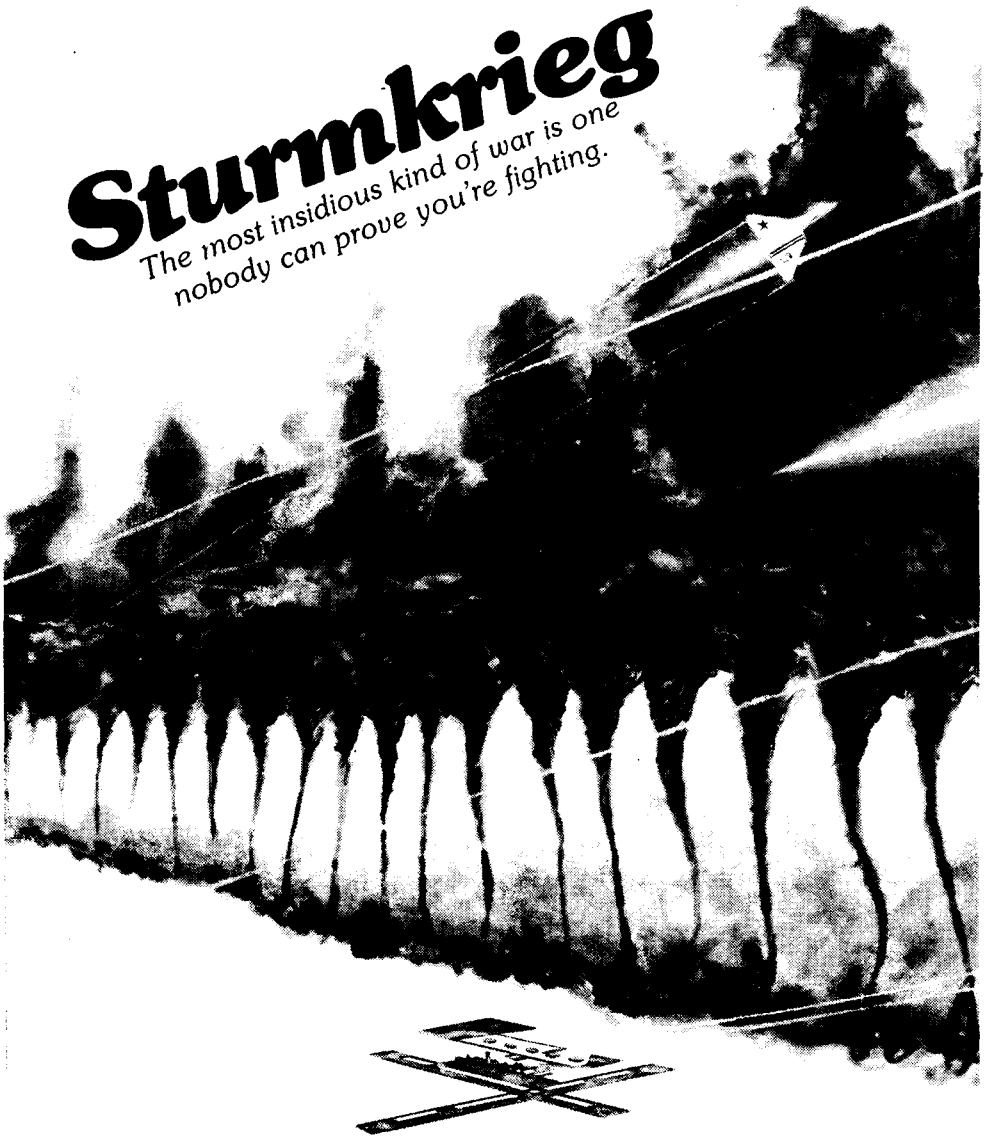
Sturmkrieg

The most insidious kind of war is one nobody can prove you're fighting.



by Ronald R. Lambert

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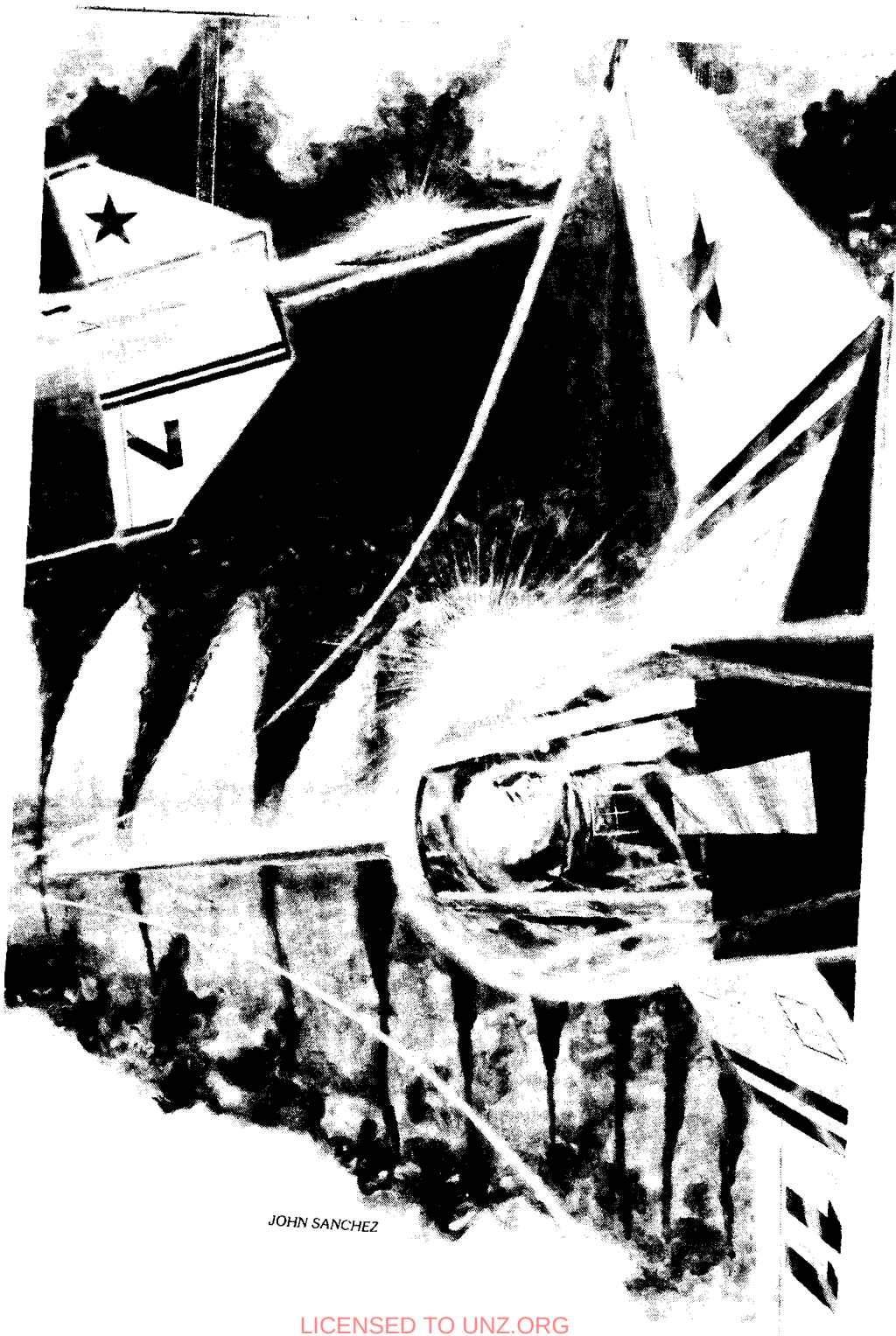

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I herd the clouds, poisonous and glowing. I keep them away. I keep us safe from them. It is an important job, but I am not proud.

I was proud when Leonida came. "Look out the window," I told her, smiling with secret knowledge.

All she saw was the snow-covered wastes of the Alaskan north slope. "I don't see anything but snow, General," she protested, puzzled.

"Just watch."

Somewhere in the distance whined generators. There was a throbbing, more feeling than sound. And there was something else. Subliminal at first, then building up startlingly, came the tingling. My nape hairs bristled as if in anger. Leonida looked at me questioningly. I only shook my head, and pointed out the window.

Snow sprinkled lightly from leaden skies, as it had all morning; but now there was an unusual tension in the air, as if something cataclysmic were about to happen.

Then the thunderbolt struck. Zagged lightning burned its image on the retina with a momentary brilliance surpassing that of the sun, and the explosion of earth and sky seemed to shake the planet. Where the bolt struck, a geyser of steam and pulverized permafrost erupted.

I had been expecting it, and still I was shaken. But I was pleased too, and proud. Leonida seemed frozen in an expression of terror—mouth open, eyes wide, face drained of color, arms half-raised with fingers splayed. I smiled at her and she recovered.

"You—*did* that!"

She had the most remarkably intense blue eyes—I found myself enjoying the mere fact of having her total, undivided attention. I chuckled. "Not all by myself, of course."

"But how . . .?"

Turning from the window and motioning for her to follow me, I advised her dead-pan: "If anyone asks, this is a radar station."

She blinked, then smiled crookedly. "Yes sir. Sure."

We entered the control room, and I introduced her to Tre.

"Tre, this is Specialist Lindsay, a military journalist. Leonida, this is Dr. Tremont Durand, who presses the buttons."

Tre raised his bushy black eyebrows. "Journalist?"

I nodded assuringly. "For posterity. She's wearing the hat of a chronicler right now. I've explained to her that nothing can be published about this until the project is declassified." I glanced at her, and she nodded her understanding for Tre's benefit.

The scientist grunted. "That'll be awhile." Then he seemed to notice for the first time how well Leonida filled her uniform, and warmed. "Well, then, I suppose you can ask me anything you want." He glanced at me. "She *is* cleared all the way?"

"Completely. She's going to be staying on awhile, to become thoroughly acquainted with every aspect of the project. I hope you'll cooperate with her and tell her anything she wants to know." I worded it that way because

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Tre was a civvy.

"Of course. Miss—Lindsay?"

"You might as well call me Leonida, like General Welland does. You're not wearing a uniform, so you must be a civilian—and that means you outrank me too."

Tre laughed, delighted. "Hey, I like your way of looking at things." He glanced at me archly.

"Ahem," I said, looking down at Leonida. "Just don't take that too far."

"Yes sir." She grinned.

I cleared my throat. "Tre, she asked how we induced the lightning strike. You want to fill her in?"

He nodded, smiling. As he talked, it was with a distinct air of paternalistic pride. I reflected: Some people find self-realization through children—perhaps a sort of attaining genetic immortality. That is necessary, of course. But Tre is one of those people who can find self-realization (I think) more directly, in their own personal accomplishments. It is interesting that the same feelings are apparently evoked by children and by "brain children." I wonder which is the sublimation of the other.

Leonida frowned, grappling with what Tre had told her. "You feed charges into the ground, and create a 'pool' of static charge?"

He nodded.

"Then you 'herd' the 'pool' so it concentrates where you want it—"

"And it attracts a corresponding pool of static charge in the clouds. And we can increase the static charge in the clouds if necessary through broadcast energy at certain low frequencies." Tre was quick to continue for her, almost overeager for her to understand.

She nodded acknowledgment. "Then when a critical point is reached—zap!"

"You got it."

She looked impressed, and suddenly Tre turned humble and self-effacing. "Well," he said, "I can't claim *entire* credit. This is really only a refinement of experiments performed by Nikola Tesla many years ago."

"Nikola Tesla?"

"The inventor of the alternating current motor. He was a contemporary of Thomas Edison—and in my opinion, the greater of the two."

Frowning, Leonida said, "You mean, he was able to control lightning?"

"Well, what he did—he located himself up on a mountain with a lot of fantastic gadgetry and his own high-tension powerline from the local generating plant. He used it to power a static generator and feed charges into the ground, and when conditions were right, he was actually able to initiate repeated lightning strikes."

Leonida shook her head. "But if he did that so long ago, why—"

"Didn't anyone follow up on his experiments?" he finished for her.

She nodded.

"Most people dismissed him by that time—he was old—as a senile mad scientist—all except for his terrified neighbors, who made him stop."

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Leonida joined him in an appreciative laugh.

"Of course, we have much more control than Tesla did," Tre added quickly, apparently unwilling to efface himself *too* much.

After a few moments, Leonida asked, "What do you use it for, though? I mean—I realize basic research is important. If there is not an immediate application for something, there will be eventually. I just wondered if there were any applications for what you have right now." She watched Tre carefully, hoping she had not offended him.

He smiled reassuringly. "Well, for one thing, we can drain much of the energy out of a storm. It gives us a tool for diminishing the ferocity of hurricanes and the like."

"But shouldn't you be located on the Gulf Coast? Or in the Caribbean somewhere?"

"Well—" he hesitated, then turned to me.

I took the cue. "You see," I said, "we're at war."

"At war? With whom?"

"The Russians."

She stared at me dumbly.

"Oh, they started it," I hastened to add, suppressing an amused grin.

She frowned, apparently concluding that we were ragging her. "You're joking," she accused.

"No, no, I'm serious. We are really at war with the Russians."

She sighed in evident exasperation. "What war? I haven't seen any mushroom clouds or Migs flying overhead. What *kind* of war? I—uh oh. Wait a minute. No—you don't mean . . . ."

I nodded. She was quick on the uptake; no dumb broad. "Right. We're involved in a weather war with the Russians." I watched the incredulity on her face change to alarm, and waved a hand in dismissal of the danger. "Don't worry—fortunately, we have a distinct technological advantage. They're still trying to produce gross effects with gross applications of energy. Our methods are much more sophisticated. Our control is much more precise."

"Then this station—"

"Is actually a defense installation. Started out as a research facility, but the evolution of events. . . ." I shrugged expansively to cover a sudden inexplicable lump in my throat. In a moment I recovered and added, "This is one of a network of such stations I oversee within the Arctic Circle."

Leonida shook her head dazedly and glanced at Tre, who smiled sympathetically. "This is quite a bit to take in one swallow," she murmured apologetically. "You have a whole network of weather control stations, with which you are fighting a weather war!"

"Yes," I said. "The stations, acting together, coordinated by computer, erect an effective barrier against the intrusion southward of too much polar air over the American and European land masses. You may have noticed that the winters have been unusually mild lately down south?"

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"Yes," she breathed. "Especially after the severe winters of '77, '78, and '79." Her eyes widened. "Those blizzards—"

I nodded. "The Russians caused them. That's what started the war. Remember the newspaper stories about the Russians broadcasting mysterious low-frequency radio waves in the Arctic region?"

"Yes—some scientists were quoted as saying that the frequencies used could conceivably affect the weather somehow."

I looked at Tre, and he responded, "They were the right frequencies to interact with air molecules and affect atmospheric electrical charges."

Leonida spoke with irony. "The Russians claimed they were merely testing an over-the-horizon-looking radar. And the suspicions about them being responsible for our terrible winters were generally dismissed as paranoia."

I shrugged. "Just as well. No need for people to get too excited. The Russians didn't really understand very well what they were doing, and they wound up hurting themselves as much as they hurt us. They suffered early and late frosts, which forced them to buy huge amounts of grains from us. A bit of irony in that."

"Yes."

I continued, "Of course, we knew we couldn't always count on the Russians being inept. Sooner or later they would refine their act, and then we would be in trouble, if we didn't take counter measures. So we did."

Leonida was suddenly incredulous again. "But—forgive me for saying it sir—this all seems so unnecessary. Why don't we just tell the Russians to stop it?"

"They deny doing anything. That's the thing about the weather war, you see—it is difficult to prove that anyone is really doing anything. The very charge of tampering with the weather sounds paranoid. Besides, they signed a treaty."

"A treaty?"

"Oh, yes. A few years ago our country, the Soviet Union, and twenty-nine other countries signed a treaty in Geneva that prohibited modifying the environment for military purposes."

"Well then, shouldn't that end it?" she asked hopefully. She saw our faces. "No?"

I smiled at her indulgently. "We signed a similar treaty with the Russians back in 1977, and earlier, in 1972."

"Oh."

She was not naive. She had figured it out immediately, I noted with pleasure. "Would you like to know how we produce the effective barrier I mentioned?" I waved my hand toward Tre. He took over the explaining.

I had work to do; my reports were not finished yet, and they had to be filed via our secure land line with the Pentagon that afternoon. As a long-time maverick who had only recently found himself in the unexpected but rather pleasant position of being everyone's fair-haired boy, I didn't

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want to blow it. I listened briefly while Tre explained about the creation of localized high pressure areas with low frequency broadcast energy, the resistance that air masses of different temperatures had against mixing, using "pet" high pressure areas to exert leverage on hemispheric weather formation, methods for speeding up or retarding the natural energy exchange processes of the atmosphere through selective ionization.

Finally I excused myself and returned to my office. I noticed it was snowing harder when I looked out the window, and I frowned at the sky reproachfully, as if it had done something without getting proper permission first. Then I shrugged. It had to snow sometimes—otherwise it would spoil the ecology.

Some time later, there was a soft knock at my door. I knew Tre's knock, and the technicians always pounded, so I figured it must be the lady among us. "Come in, Leonida."

She opened the door and stepped in, looking at me puzzled. "How did you know it was me?"

I smiled. "We generals have ways of knowing things. Please. Close the door and have a seat."

"I don't mean to interrupt—I see you're busy."

"Please—I welcome the distraction. This is the part of my job that I consider the necessary evil." I swept my hand over the paper-littered desktop.

She sat down gingerly in the seat across from me and balanced on the forward edge. I found myself wishing that she would be more relaxed with me. (Relax yourself! I thought. She's half your age. You're old enough to be her father. Then I analyzed: what was I trying to do, invoke some kind of incest taboo? Hell with it.)

"General Welland, sir—"

"Please," I said quickly. "We're informal here. Call me Bret."

Then a moment of silence, and I wondered if I had committed a faux pas.

But she smiled a little uncertainly and nodded. "I wonder if I might ask you a few questions about yourself."

"Shoot. I reserve the right to tell it better than it is, of course."

She laughed.

"Leonida," I said, as if the name were a morsel to be savored. "That's a rather big handle, isn't it? Sure you don't prefer something shorter?"

"Oh—please. No, really, I prefer Leonida. It feeds my delusions of grandeur. Besides, I hate to be called Leon—or even worse, Leo."

"You could be called Leona," I pointed out.

She made a face. "No thank you. I like Leonida. It's my weird."

"Your—*weird*?"

She smiled but did not elaborate. I had a sudden feeling of being out of touch with the younger generation. Nobody in my generation ever talked about having a 'weird.'

"General—Bret—I was wondering how you came to be out here—I mean, you're a general, way out here in the boondocks . . . ."

I regarded her with amusement as

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her voice trailed off and she sat there looking uncomfortable. I chuckled. "So whose toes did I step on, to get me banished to these nethermost parts of the Earth?"

She flushed slightly. Looked attractive doing it, too.

I bailed her out. "I assure you, I am really here by choice. Oh, some of my colleagues think I'm nuts, being so gung-ho for basic research. I'll grant you that. And, I will acknowledge that I've always been pretty much of a maverick—not exactly a card-carrying member of the 'Old Boys Club.'" I spread my arms in a gesture that took in the base and the countryside out the window. "But this is my place in the sun. My ecological niche. Out here, I'm more or less free to run my own show. So I'm happy, and I suppose some of my colleagues are happy to have me out of the way."

"A mutually beneficial relationship?" She suggested.

I pointed my finger. "That, exactly."

"But now—I mean, with the weather war—aren't you pretty much in the limelight? Like, the man on the spot?"

I chuckled, suddenly uneasy. She was coming close to home. Fact was, after a lifetime as a maverick, and many years as a virtual exile in my own little remote kingdom up north, I was finding the sudden attention and interest and *warmth* of my colleagues very pleasurable. Some answering emotion in me, some long neglected need I didn't quite understand, or was afraid to fully admit to, made me feel vulnerable, and I tried to hide it. Man is a social creature, they say—and even us mavericks are human. I—well, enough of that.

What I said was, "To an extent, yes, I suppose you could say I'm the man on the spot. Of course, you know, that can also mean that I'm the man on the hotseat. I'm allowed certain privileges and freedoms and I have a certain honor conferred on me to be in charge of all this. But with it goes heavy responsibilities, too. Today I may be everybody's fair-haired boy." I chuckled loudly. "Tomorrow I could be everybody's goat."

She looked at me sympathetically and smiled. "I understand," she said softly. I fell in love with her at that moment.

"Do you really like it here that much though?" she asked. "You could be in Washington or someplace civilized like that. You could run things from there, couldn't you, just as well?"

I took a breath and held it for a moment. "Well—there is some question as to whether Washington is civilized—"

"General!"

We both laughed.

Finally I added, "I like to be out here where I figure the real action is. Besides, I am of some use on the project. I have training as a computer operator. Just because I'm a general doesn't mean I'm ignorant."

That took her by surprise; she gasped and broke up.

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Eventually—reluctantly—I had to shoo her out of my office so I could get back to work. She had reminded me somehow of my wish to do a conscientious job on my reports. I applied myself resolutely, and got the copy ready for the special courier dispatch in time.

The courier's plane landed on our little airstrip, and I awaited the knock on my door. When it came, and I bid him enter, I was surprised to see who the courier was this time. Captain Crenshaw, who was one of the Pentagon Chiefs of Staff's Bright Young Men. Instinctively I straightened my shoulders and stood up. It was a curious situation. Although I vastly outranked the man, he spoke for my superiors, and I had to take orders from him.

"Captain," I said pleasantly, but not feeling it, "what brings you up here to the frozen north?"

Crenshaw was tall, brawny, and square of shoulder and jaw. Under his left arm was a message satchel. He saluted, then withdrew a sheaf of papers from it and handed them to me. "Sir, I came to deliver these to you, at General McAllister's personal request. He thought it might be a good idea for me to be present to answer any questions I can, that you may have, concerning your orders, sir." He stood stiffly at attention.

I waved at him. "At ease, Captain." I looked over the freshly cut orders apprehensively. As their import dawned on me, I knew a feeling of mounting desperation and horror.

"There must be some mistake—I've talked about this with Mac and the others. I—"

Crenshaw was shaking his head. "No mistake, sir."

Even though it was useless to argue with the messenger, I said, "But going on the offensive, carrying the weather war to the Russians—don't they understand what that would mean? We could do tremendous damage . . . ."

The captain waited for a moment to make sure he could speak. Then he said, "General McAllister, sir, told me that what you have said is precisely the point. We do have tremendous capability, which constitutes a decided military advantage, and the consensus among the Chiefs is that we should use this capability while we still enjoy such an advantage. Those are the general's own words, sir. Verbatim."

I suddenly felt tired, and sat down behind my desk. "But a weather war," I protested, "would be a war against civilians. We can unleash all the power of the northern hemisphere's weather system against Russia. I don't want to have a Dresden on my conscience!"

Just when I was beginning to like being on the "in" with the Old Boys for a change, this had to come! I cradled my head in my hands.

Crenshaw was stolid. "Sir, I am further instructed to inform you that if you will not carry out your orders, you will be relieved of command and replaced with someone who will."

I looked up at him sharply. "Damn it, I know that! You don't need to tell me that!" I looked at him closely.

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"You enjoy this, don't you?" I could see it all—he was the superloyal sychophant type of executive officer. The kind that disapproved of anything or anyone that did not conform to his superior's wishes. While his superior tolerated me, Crenshaw hated me. I had seen that kind of thing time and again in the military, and had been careful to avoid surrounding myself with such men.

"Enjoy, sir?" repeated the captain, a little too heavily to sound innocent. "I'm only doing my duty sir. Delivering a message."

I regarded him narrowly. There were ways, and then there were ways, of interpreting duty. Disgustedly, I turned away from him, to gaze out the window. The snow had stopped. I couldn't even find momentary solace in the sense of seclusion that a good snowstorm affords.

What were my alternatives? If I refused, not only would I lose my command, it would mean the end of my military career. I couldn't face that. The army was all the family I had now. How could I walk out on the only life I knew, to enter a world of strangers with alien philosophies?

"I have to have an answer to take back with me to the general, sir," Crenshaw said behind me.

I closed my eyes in pain. Then I sighed, and without turning around, I replied, "You may tell General McAllister that I will carry out his orders. To the letter. But under protest!"

I heard him salute. "Yes sir. Then, if you have the report you're due to file, I'll return to Washington."

"On the desk," I said tiredly, waving a hand back at the desk still without turning around.

I heard the shuffling of papers as he put my report into his satchel. Then I heard him salute. "Thank you, sir."

"Dismissed," I replied. The door clicked shut.

It was then that I decided to write this journal. Pilate used a basin of water.

Most of the base personnel were somber as I told them about the new orders, but they accepted them as soldiers. Tre, however, exploded. I could see the loss of respect in his eyes.

"But you!" he exclaimed. "How can you go along with this!"

I sighed. "I don't—but if I refused, I would merely be replaced."

"So—it's the same old story!" he said bitterly.

"Yes," I said wearily. "And as always, it has the same ending."

"Andersonville," he grated, "Nuremburg, My Lai, mean nothing to—"

I cut him off. "Of course, you will have to be sequestered."

"What?"

"I really have no choice in that. You know. We can't afford any 'leaks' to the news media—not while we've got a war going on."

"Shit!"

"I'll—have you set up at the research facility at Los Alamos. They do some peacetime-oriented research there, you know. You won't be bored,

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at least." I turned away. I didn't want to see his face. Nor, apparently, did he want to see mine. He left the room.

Leonida came up to me and placed her hand on my shoulder. She didn't approve of what we were going to do, and she knew that I didn't. But she was a soldier too. She understood. I smiled and patted her hand appreciatively. At least she would be here through it all. The thought made me feel a little warmer; took some of the chill out of my heart.

Tre was replaced by his understudy, Dr. Radley Hoskins, who had been carrying on his end of the project recently at the Air Force Weapons Laboratory. Rad, if he had any qualms about what the Pentagon wanted of him, at least did not allow them to get in his way. He spent a week refamiliarizing himself with our setup, checking out programs and communications with our sister bases.

Then Rad began the offensive. First he beamed energy into high altitude weather fronts in patterns calculated to increase temperature and air pressure variances, and reduce thermal mixing of the atmosphere. The consequence of this was to augment atmospheric turbulence, to give us more to work with. We had never dared do this before on such a large scale, but we were pulling out all the stops now. And frankly, we were astonished at the results. When we used our captive high-pressure areas to direct weather formations where we wanted them, and manipulated atmospheric electrical charges to initiate the storms—we got meteorological violence that was absolutely unprecedented.

Tornadoes are incredibly savage manifestations of nature running amok. Anyone who has seen one up close knows the utter terror they can inspire. Against such awesome, raging power one feels—and *is*—totally helpless. The only thing that can be worse than one tornado is more than one. Now and then double tornadoes strike the central part of our country, around Oklahoma.

But against the populous, industrialized portions of European Russia, we sent long lines of tornadoes, in wave after wave. The damage far exceeded our expectations. In fact, the word was not 'damage'—the word was 'devastation!' Plainly and simply, we laid waste to Russia. It took only a few days. What the tornadoes did not destroy, the torrential rains and rising floods did. For a time, the entire might of the northern hemisphere's weather machine was concentrated on European Russia.

We were all kept busy orchestrating the continuing onslaught, but every time a satellite weather photo came in, we paused to stare in disbelief and shake our heads. The photos didn't tell us everything, but we could see the incredibly dense cloud cover boiling over Moscow, Leningrad, Minsk, Kiev—and we knew something was happening there that humans probably had never experienced before. Stormwatch satellites detected the synchrotron radiation characteristic

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of tornadoes, and pinpointed virtually hundreds of sources.

It was unreal. Hard to believe. It seemed like a game, a pretense—we punched buttons and gave orders over com-links, and *supposedly* all these incredible things were happening in a far distant part of the earth. But yet another part of me was not incredulous. Deep inside I felt a growing horror, a feeling of sickness. Human beings were being killed in terrible, violent ways. My conscience knew it.

Rad was gung-ho. On the third day, when the true effectiveness of our operation was overwhelmingly apparent, he turned from his computer analyses of data supplied by satellites and grabbed my arm.

"General! We're going to win! We're actually going to *win*!"

I looked at him for a moment at a loss for words. Then I shrugged and muttered, "That's what we're supposed to do."

It was his turn to look at me funny. "You—ah—don't seem to be celebrating our success. This means the demise of the Russian empire!"

I was reluctant to put my thoughts into words. No one likes to be a wet blanket. But then Leonida came up beside me. For a moment, abstractedly, I noticed that I could *feel* her presence.

"Bret? What's the matter? You look pale."

I sighed in resignation. "Maybe we're being too successful."

"I don't follow you," said Rad.

I looked at Leonida. She was more pleasant to look at. I felt a sense of communion when I looked into her eyes. "We didn't expect such spectacular results. It wasn't in our planning. No studies were done. Look—we expected that the Russians would object to what we're doing. Premier Malenev would get on the hotline and demand that we stop it, and the president would simply deny that we were doing anything—just like the Russians have repeatedly denied that they were doing anything when we objected to them about the weather war. And if the extent of the weather war had been merely to cripple their economy by attrition, we could have made our denial stick—dismiss it all as just a particularly bad year for the Russians."

Rad said slowly, "But it sounds farfetched to most poeple, the idea that anyone could control the weather to such an extent. They could never absolutely *prove* anything. We couldn't, when we were on the receiving end."

I looked at him. He did not have the grounding I did in military—and militarist—thinking. He couldn't see it.

Leonida, however, could. "But we're *destroying* them," she said. "They're going down, and they have to know it!"

I nodded solemnly to her.

"What will they do?" Rad asked, suddenly apprehensive.

I shrugged. "What would we do? There certainly must be a temptation to take us down with them."

Leonida had difficulty breathing. She put her hand to her throat.

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"We've got to stop—call off the weather war! Rad!"

He stared at her and spread his hands in a gesture of helplessness. "We're dealing with tremendous air masses. There's a lot of inertia involved. It took us several days to get the present weather format in the northern hemisphere set up, and it would take us several days to change it back. And by then—?" he shrugged.

The Pentagon was concerned about how the Russians would react, too. I felt a tragic sense of futility as I explained to them. What we had set in motion couldn't be stopped in time.

The next day, we found out how the Russians would react. NORAD alerted us that ballistic missiles were on their way. We sat still, everyone at the base, in the control room. Blood drained from our faces with the knowledge that World War III had come. Weather war had given way to nuclear war. It was Armageddon, at last.

"The laser antimissile defense systems . . ." Rad began hopefully, then his voice trailed off.

"—Are only partially deployed," I finished for him.

We waited tensely. Any moment now, a fusion inferno could burst into life overhead and snuff out our lives. Damocles' Sword had finally slipped, and we were directly beneath it. We, and all of western civilization.

"Maybe we won't be targeted," Leonida suggested.

I nodded, desiring to give her whatever encouragement I could. "They may not want to waste a warhead on us, if they don't know this is the command center for the weather war. If they only know us as a radar station—well, the DEW line is no longer important now that the missiles have been launched."

Rad exploded. "The damned bastards! We *proved* them wrong! We *proved* that our system is superior to theirs. Our system promotes inventive ingenuity better than theirs, produces more real wealth and power. We proved it in space, and we proved it decisively with weather control! But no—they wouldn't just accept it. They had to be spiteful, and try to take the whole world down with them. I'll hate those bloody bastards to the day I die!"

I felt genuine distaste for Rad. "You may not have long to wait," I commented coldly.

One of our lines went dead. I leaned over the console and punched buttons, but there was no reacquisition. I sighed and straightened up. "They got Thule."

Would we be next?

Then we heard a rumble, which kept on and on. But it was distant. I glanced around at the consoles, but none of our lines went out. "The north slope oil field?" I speculated out loud at sudden thought.

Rad frowned. "But that's about played out anyhow, isn't it?"

I shrugged. If the Russians were going even for peripheral targets like that, then that meant they were going for everything. Our chances for survival diminished.

But we waited, as the endless

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minutes went by. We were not hit. Washington D.C. was hit. The laser installation up in the Appalachians had been overwhelmed by sheer numbers. Three warheads—one from the north, and two submarine-launched missiles from the Atlantic, obliterated the Gem of the Ocean.

The laser installation in the Los Angeles Mountains malfunctioned. Hollywood, and the American Dream Machine, were gone.

Chicago and Detroit, which had been unprotected by lasers, vanished from the face of the Earth.

Other places, the laser defenses succeeded in blunting the Russian attack. It appeared that while the U.S. was hurt, it was far from destroyed.

As soon as Thule was hit, the order was given which launched the U.S. retaliatory attack. I must confess that I was not entirely displeased when NORAD reports came in tracking our missiles on their way to Russia. After all, the Russians had started the weather war, and then they had started the nuclear war. Theirs was surely the greater degree of guilt.

Later, satellite photos and aerial reconnaissance showed that Russia had been totally destroyed. I was surprised a little at that—I thought their laser defense system had been more widely deployed than ours. But then I realized the answer: our weather war had probably knocked out most of the laser installations, and the storms probably wreaked havoc with the targeting radar or lasdar of those that survived.

We won. The world had not ended. Civilization had not fallen. We had actually won World War III. It had cost us over 50 million casualties—and the Russians an estimated 150 million. One hundred million had died in Europe, but there were enough survivors to rebuild.

Surprisingly, most of our weather control stations were unscathed. One of our ships that had just been outfitted survived, and I ordered it to take up a position off Greenland, to take the place of the base we had lost at Thule. We still had work to do.

I explained things to Rad, Leonida, and the complement of technicians at our base why it wasn't over for us.

"We can't let it rain," I said. "At least, not in the U.S. or in Europe. Any rain or other precipitation will contain lethal radioactive contaminants. We cannot let the fallout ruin our remaining uncontaminated croplands."

Rad pointed out, "But it's got to rain somewhere. We can prevent it from raining in some places, but only by making it rain in other places, instead."

I nodded. "I am aware of that. We have to "dump" it somewhere. The oceans are out. I propose that we dump it in Siberia. It's a large landmass, and has never been highly populated."

Rad mused, "Exile it to Siberia."

"Yeah, something like that. Anyway, we've got to get busy right away. We've got radioactive clouds to herd."

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"Uh, Bret—General—" it was Leonida. "For how long is this going to be? The U.S. and Europe going without rain, I mean."

I looked at Rad and raised my eyebrows inquiringly as I suggested, "Maybe a year?"

Rad corrected, "Possibly two. When Krakatoa blew its top, it took about two years for the bulk of the particulate debris to filter down out of the upper atmosphere. Historians say it produced spectaculor sunsets around the world for two years after the eruption."

Leonida sucked in her breath. "That's going to be an awfully long drought!"

I nodded. "We can survive for a while by irrigation. Anyway, the alternative would be the contamination of our croplands for a millenium."

There was hope for us. For America, for western civilization. It was our ability to control the weather that gave us that hope.

Of course, there was little we could do about the southern hemisphere. That saddened me. But we had no weather control bases there, and we couldn't spare any ships. We needed all the resources we had to keep the radioactive rain off our heads. They would get fallout in South America, Africa, and Australia, there was no doubt about that. The northern and southern hemispheric weather systems are connected, even if they are discrete. Oh well, there was no use worrying about something that couldn't be helped.

Later, I talked to Leonida alone in my office. "Do you wish to stay here?" I asked her hopefully. I was desperate for her to stay. I wanted her with me.

She looked at me a long time, then dropped her gaze and shook her head regretfully. "I think—well, there are large portions of the country where the army is still struggling to restore order. There's a big rebuilding and rehabilitation job for us down south. I really think my duty is there. I'm no real use here. Down south I can do some good. They need me."

I nodded, averting my eyes from her. I swallowed the lump in my throat. "Of course. I'll arrange transport."

When she closed the door, she left me behind in an empty room. I couldn't really blame her if she preferred to go back down south and maybe find some young buck to play Adam and Eve with. I was twice her age, I reminded myself for the umpteenth time. But one can't be blamed for hoping.

So the days pass, the weeks pass, the months pass. I herd the clouds, poisonous and glowing. I keep them away. I keep us safe from them. It is an important job, but I am not proud.

I am only duty-bound, and lonely.

Every now and then, I wonder if I should feel guilty for my part in all that happened. I tell myself that I shouldn't. After all, I was only following orders.

Then again, I think sometimes that perhaps what I am doing is penance. ■

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Neglected Technology

One of the easiest and quickest ways to come up with new technology is to look at old technology.

More specifically, if you want to make a major breakthrough or develop a novel product, look for neglected technologies.

Science and technology move in quantumlike spurts of activity in areas of interest that become extremely faddish. When a new area suddenly gets "hot," developments and refinements come thick and fast. And they breed little technical fillips of great elegance and wonder. As a result of pressures to complete the thesis on time, finish the program before the money runs out, or get the product on the market so you can either draw a paycheck at last or pay dividends to anxious stockholders, a tremendous amount of data, know-how, technique, gadgetry, and progress in the state of the art gets left in the cultch pile (cultch = ancient New England term for useable junk) because it was interesting but not really germane. Or it was an inexplicable data point that did not fall on the curve. Or it threatened someone's tenure, career, philosophy, political ideology, or latest paper in *The Physical Review*. A lot of items get put back on the lab shelf simply because nobody knows what the hell to do with them. There isn't an apparent market, or the state of the art really isn't up to exploiting it, or it simply gets forgotten.

These neglected tidbits of technology offer a most fruitful happy hunting ground for producing really *new* directions in science and technology. And the history of science and technology is rife with examples.

Because you are reading this, you are not watching TV which uses the cathode ray tube developed by Sir William Crookes in 1885. Strangely, it is still called a "cathode ray tube" or CRT because Crookes invented it to investigate "cathode rays." The CRT

by G. Harry Stine

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effectively lay on the laboratory shelf for decades. Although Boris Rosing in Russia developed the first television system using the CRT in the 1900 decade, and although some CRT's were used in laboratory oscilloscopes, it wasn't until Philo Farnsworth came up with today's basic TV system in 1928 that Sir William Crookes' invention left the realm of neglected technology.

Were it not for lack of a suitable high-vacuum source, the acknowledged inventor of the electric light would be Sir Humphrey Davy who developed the arc lamp in 1810 or Sir William Groves who perfected the platinum-filament light bulb in 1840. But there was no shortage of whale oil to drive the technology at that time. Thomas Alva Edison not only pioneered modern industrial research but was also one of the very first high-technology marketing men; it took that combination to synthesize all of the elements of the electric power industry and to convert it from various laboratory exhibits into profitable technology to benefit people.

Edison himself created some neglected technology, as might be expected. While working on his electric light bulb, he discovered the Edison Effect in 1883—an interesting but useless phenomenon at the time. Fleming picked it up in 1896 to create the vacuum tube diode which laid the foundation for vacuum tube electronics technology.

Electronics is a field where neglected technology runs rampant because of limitations in the state of the art at any given time and because of rapid progress of the technology. Solid-state electronics did not begin with Shockley and Bardeen. The rectifying properties of selenium were observed by Fritts in 1883. The copper-cuprous oxide contact rectifier was developed by L. O. Grondahl in 1926. And the NPN transistor was invented and patented by Julius Edgar Lilienfield of Brooklyn, New York (see U.S. Patent 1,745,175 granted January 28, 1930, application filed on October 8, 1926). Solid-state electronics lay absolutely dormant for twenty years and is another prime example of neglected technology. Why? Well, everybody was thinking "vacuum tubes," and that's where the action was. Besides, the limit on the state of the art of vacuum tubes had not yet been reached...

When was the first jet aircraft flown? "Easy question! The Heinkel He-178 powered by a Heinkel-Hirth jet engine in Germany in August 1939!" Wrong. The first jet-propelled aircraft made an attempted flight at Issy-les-Moulineaux near Paris, France on December 10, 1910. It was built and operated by Dr. Henri Marie Coanda who crashed it on takeoff because he did not know how to fly an airplane! The technology of jet-propelled flight languished in neglect for thirty years because aeronautical engineering was squeezing more and more efficiency out of the propeller and gasoline internal combustion engine combination. High-temper-

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ature turbine technology was well-established in the electric generator field long before August 1939. Neglected technology because the technologists were busy doing something else.

Coanda is also responsible for another neglected technology. In 1932, Coanda discovered the tendency of a moving sheet of fluid to adhere to an adjacent tangential surface. Dr. Albert Metral labelled this the "Coanda Effect." For thirty years, Coanda Effect was neglected technology and, to some extent, still is. In the early 1960's, the U.S. Army's Diamond Ordnance Laboratories applied Coanda Effect to the solution of some problems in guidance systems, and the "new" science of fluidics was born. Coanda Effect has much broader applications, but fluid dynamicists are currently working on other things. Most recent applications of Coanda Effect show a surprising misunderstanding of the phenomenon. For example: NASA has been screwing around for fifteen years on blown wing flaps and trailing edges of wings; this work has shown a dramatic change in the low-speed aerodynamic characteristics of such flying anvils as the Boeing 707 prototype and the Grumman A-6 Intruder. The Boeing YC-14 is partially applying Coanda Effect by using the jet engine exhausts to blow the upper surface of part of the wing. There exist two interesting pieces of data with regard to Coanda Effect applications, and they are neglected and forgotten:

1. In 1935, the French counterpart of NACA/NASA now called ONERA conducted tests on a fully-blown Coanda-designed wing, a "lenticular aerodyne," in the wind tunnels at Chalais Meudon near Paris. These tests confirmed that the Coanda "lenticular aerodyne" was a wing that would produce significant aerodynamic lift at zero forward airspeed! The data is available to any who will take the time and trouble to look.

2. Coanda used his effect to develop a series of silencer-scavenger units for internal combustion engines. The Automobile Club of France tested one of these on a motorcycle on July 8, 1935 and reported a 15% increase in brake horsepower and fuel efficiency accompanied by an almost total silencing of the engine. Just before World War II, the British Air Ministry ran tests with Coanda's silencer-scavengers on a nine-cylinder radial aircraft engine at Coventry. The results showed a 5% improvement in brake horsepower and fuel consumption; the motor was also silenced to the point where observers could hear the clicking action of the o.h.v. push rods . . . faced with a growing shortage of inexpensive petroleum, perhaps this area of neglected technology bears some attention.

In view of the current and projected petroleum situation, it might be well to look at another neglected technology to determine (a) whether or not progress in the state of the art of another technology would dramatically improve the neglected tech-

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nology, and/or (b) if changes in the economic or market situation would now render the neglected technology viable.

The steam car has been around for as many years as the gasoline car. However, as long as petroleum could be obtained cheaply and as long as nearly all of the development capital was being spent on cleaning up and squeezing a fraction of a percentage more efficiency from gasoline internal combustion engines, the steam-powered auto languished except in the minds and hands of a devoted few advocates. Fast, beautiful, economical, and environmentally-acceptable steam cars have been designed, built, and tested. They will burn nearly anything that will combust with atmospheric oxygen. Because human beings everywhere who have possessed an automobile are extremely reluctant to give up the freedom of movement it provides, the smart entrepeneur should certainly consider the neglected technology of steam cars while the collectivists spin their wheels for mass transit in a world that has developed around personal transportation since the days of the horse and ox cart.

Another area of neglected technology is psionics. John W. Campbell pushed psionics in Analog because he always wanted to get people to think. But psionics bothers a lot of people badly enough that they dismiss it out of hand. I did until I built a Hieronymous Machine described in detail in this magazine about twenty-five years ago. I did it to prove that Campbell was full of it. I had a couple of sleepless nights trying to figure out why the Hieronymous Machine worked when everything that I had ever been taught told me that it shouldn't. I then had fun trying it on other unsuspecting scientists and engineers. One morning in Connecticut, I looked out and discovered my water well repairman using dowsing rods to locate my underground wellhead. I discovered that the municipal water company in Milford, Connecticut used dowsing rods to locate their underground lines. I am given to understand that the Marines used dowsing rods in Viet Nam for locating underground Cong tunnels. The neglected technology of psionics is obviously there, it is being used peripherally, and it may someday gain wider acceptance as we begin to learn more about our minds and nervous systems through biocybernetics.

The universe is full of wonderous things that we have (a) not discovered yet, and (b) discovered but forgotten. But things change. Existing areas of technology reach saturation points where acres of engineers and millions of dollars will improve the technology by a fraction of a percent. Then some mavericks emerge from a garage with something new built with a few hundred or thousand dollars from neglected technology up-dated by cross-fertilization with know-how from mature technologies. It has happened before, and it will certainly happen again...and it will happen just when it is needed. ■

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RICHARD ANDERSON

As we've said before, the energy crisis isn't a technological problem . . .

a bit of high finance

by Frederick William Croft

Of course, I've never met Aurelius. Too risky. I've never seen his face; I don't know his real name—but I know what I need to. I know he has influence. I know he's a member of a powerful if equally faceless group of financial manipulators, part of that capitalized *They* that everyone in the securities business knows is out there, cornering wheat futures or forcing Teledyne down twenty points in a day. And I know that on occasion they'll pay me to help on certain projects,

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both with money and with the even-more-valuable foreknowledge of what *They* are planning. It puts me in a good position; there's hardly an analyst on Wall Street who wouldn't trade places, were my situation a matter of public knowledge.

So I listened when Aurelius called. Like last time . . . .

"We," he announced, "have a problem."

I nodded dutifully to the phone. "Everyone has a problem. These are troubled times . . . ."

Aurelius sounded peeved. "This problem is particularly *ours*. Big one. The energy crisis . . . ."

"Ah, yes. We've gotta do something about the energy situation."

He coughed. "If you knew the size of our investments in power technologies, you'd know we've gotta *not* do anything about the energy situation. That's the problem—somebody's come up with a solution."

The plot thickens. "An improved power plant?"

Aurelius sighed. "Exactly. Power plant is just what it is. Relative of the soybean, in fact."

The story poured out. A studious young botanist with the improbable name of Ivan Garcia had returned to graduate school after doing time in the Air Force and was working on electrical reflexes in plants. Many plants have these . . . changes in potential when a leaf is cut, reactions to a temperature drop. Sort of a proto-nervous system. And through cross-breeding and some pretty strange moves with genetic material, Garcia came up with a plant that produced *large* quantities of this electrical power, a variant of photosynthesis which turned sunlight directly into electricity. A major advance, no doubt about it.

I nodded again. "Can't have that on the market."

"Damn straight." Aurelius sounded relieved at my agreement. "The man's crazy—wants to seed these things everywhere. *Give* them away. What kind of an attitude is that?"

Sacreligious. "What am I supposed to do about it?"

His reply was simple and to the point. "Stop him."

Ivan Garcia was a caricature mad scientist, all angular limbs and myopic eyes and frazzled hair above a laboratory smock with a thermometer in the pocket. He seemed normal enough when he spoke. Said "no" like just plain folks.

"I'm not sure you understand," I said cautiously. Beyond him, a palm-strewn Los Angeles landscape simmered under a cloudless August sky. "We're prepared to pay quite handsomely for your idea. And give you a percentage, too . . . ." Not that he'd ever collect on that.

Ivan smiled. He smiled a lot, more than anyone who was totally sane. "I'm sure you are," he said. "But that's not the point. The money isn't important—this is a moral point with me."

I raised an eyebrow.

Ivan beamed. "For seven years I've

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been putting all my money where I thought it was safe—Consolidated Electric stock." He frowned. "Have you followed Con Electric? Down forty points this quarter—I'm destroyed!" His eyes were tragic. "I've set out to do something about power companies, and now that I've come up with an answer it's a moral point with me. I feel morally obligated to grind those jokers into a powder." He smiled beatifically.

Since Con Electric was one of the few power companies not owned by *They*, I found it hard to sympathize. (Their stock should only drop to one-tenth par.) Tantalizingly near, the power plant sat on the coffee table in a cracked clay pot. It looked something like a geranium. "Well, the Bible tells us it's often wisest to be charitable. Perhaps this cashier's check for one million dollars might ease the pain of Con Electric." I smiled confidently. "There's a lot you can do with a million dollars. Think of it! A new home . . . ."

"Just bought one," said Ivan Garcia.

"A new car . . . ."

Ivan smiled. "Arrived last week. 450SL Mercedes."

"Maybe a yacht . . . .?"

"Fifty footer. I've got it berthed down at the Marina."

I stopped. Ivan Garcia was one hell of a *prosperous* mad scientist, particularly when he gave his inventions away. Something was wrong here.

The door swung open and a young man darted in, saying "Uh—Ivan, about those convertible bonds . . . ." He stopped abruptly. I swiveled to face him. He wore a three piece suit in a blue pinstripe, suspiciously like the blue pinstipe I was wearing at that very moment. His thin silk tie slashed across a white Arrow shirt, and a gold Patek Phillipe much like my own glittered on one pale wrist. I was beginning to feel *had*.

He smiled, an even more unbalanced expression than Ivan Garcia's. "Sorry, didn't know you had company. Guess I'll be going . . . ." There was an awkward silence as he noticed the Walther PPK in my hand.

"Who're you with?"

He looked embarrassed. "Fertilizer cartel."

I raised an eyebrow and he blushed. "I only got my MBA last June—all the good ones were taken."

I nodded sympathetically. Everyone has to start somewhere. "How're you mixed up with energy?"

He shrugged. "If this goes over, everyone'll be raising their own power. These things'll be growing everywhere." He nodded reverently to the plant on the coffee table. "Think of the fertilizer market!"

"An inspirational picture, I'm sure." I gestured with the PPK. "Pity I'll have to interrupt it . . . ."

I stepped over to the coffee table. "Wouldn't want to overstay my welcome . . . ."

Ivan Garcia didn't look well. The thought of not dusting Con Electric—and collecting all those Mercedes, yachts, et al in the proc-

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ess—had him in a fit of nihilistic despair. Couldn't say I blamed him.

I paused by the coffee table. "Well, gentlemen, parting is such sweet sorrow . . . ." I reached for the plant.

And it wasn't there! Ivan Garcia responded with unlikely speed, doing an incredible Baryshnikov leap to the coffee table to grab the plant and dive for the door.

The fertilizer cartel man and I were right behind him, moving faster than short sellers on the gold market following an IMF auction announcement. Garcia made an Olympic sprint towards a battered Toyota in the parking lot. I wished for oxygen.

He leapt into the car, got it started and rocketed out of the parking lot with a rain of small Japanese carburetor parts.

The fertilizer cartel man pulled up in a fabulously expensive German sports car. Out of a misguided sense of professional loyalty he swung open the door for me—we financial manipulators had to stick together. Where would we be if people didn't stick around to be manipulated?

We set out at a velocity approaching Mach Two and shot out the 134 Freeway northbound. Garcia had the Toyota doing over ninety and was leaning on it for all he was worth. He took the turnoff for the San Diego freeway, heading for the airport. We were now doing one hundred and ten . . . .

Two major crashes, a whiplash, seven black eyes, fifty yards of cyclone fencing and several thousand harsh words later we swung into the vast oval parking drive around the Los Angeles International Airport. As always, airport traffic was piled up immovably—cars dusty from endless motionless hours, overheated engines wheezing their last while drivers looked with desperate eyes for a nonexistent parking space—which meant we had to go from one hundred plus mph to zero in about ten seconds. Somehow we made it.

I opened the door. Garcia saw me and jumped out of his own car, heading for the airfield. I leapt after him, leaving the fertilizer cartel man stuck in his car, where—considering airport traffic—he probably remains to this day.

Garcia hit the chain link fence and climbed faster than Fox stock after *Star Wars* to drop over on the far side with the planes. I clambered after him, making a vain effort to save my Hart, Schaffner and Marx three piece from snagging on the sharp edges.

Garcia was climbing in the hatch of a C-47. I followed. Just as I pulled myself inside the cabin there was an unsteady lurch as the engines kicked over. I ran up towards the controls . . . .

Garcia was seated at the controls with an operator's manual on his lap and the plant on the floor beside him. The cabin wobbled as we creaked onto the runway. Screeches erupted from the radio tuned to the control tower.

I grabbed his shoulder. "What're you doing?"

He didn't look up. "I'm stealing a plane. This is your last chance to get off before I head into the wild blue stratosphere."

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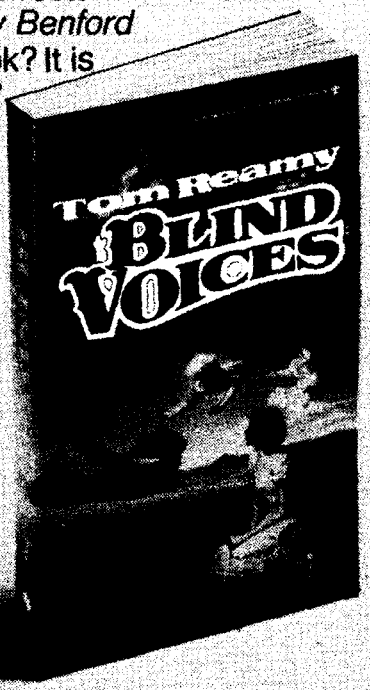

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I gestured with the PPK. "Turn this thing off!"

He shook his head. "Nope. And you're not getting the plant. I don't care about the gun."

I grabbed for the plant. Garcia lurched against the control panel. There was a sound like a thousand groaning camels from a Turhan Bey movie as the throttles slid home. A brutal acceleration slammed me against the back of the cabin. Kaleidoscopic flashes of color spun outside the front window as other planes dove out of our way. I thought of praying . . . .

Somehow we came out of it. The engines subsided into a dull insect droning; the cabin righted itself. Shakily, I climbed to my feet. "That was some takeoff."

He nodded. "Would've been even better if I'd have finished flight school before they bounced me out of the Air Force."

Now he told me.

I jerked back the slide of the PPK and scooped up the plant, trying to look more authoritative than I felt. "I think we've wasted enough time—land us!"

He looked up mildly. Through the window beyond him I saw the glitter of Los Angeles give way to the barren peaks separating it from the Mojave desert. "I'm—not sure I can," he said.

This was no time to fool around. I gestured with the PPK. "This is no time to fool around!" He shrugged.

The situation was getting desperate. Viciously, I slammed the gun against the plant. "Alright—so you want to play that way? If you don't land, I pull the trigger!"

He paled. "Not now! It's ready to seed!"

I pulled back the hammer, grinning wickedly. "I don't care if it's ready to recite the Bill of Rights—land us or your life's work gets the firing squad!"

His eyes looked like poached eggs. I half-expected him to break into *Woodsman, spare that tree.* "But—you don't understand! The seeds . . . the propagation energy . . . ."

I gestured with the PPK. He made a grab for it, and I dropped the plant. We struggled. The gun went off . . . .

It was hot, which is what you'd expect in the middle of the Mojave desert. An angry sun blazed out of the bloodshot sky; parched rocks glowed as though radioactive. The landscape around us was strewn with C-47 parts. And plant spores—millions of them. I'd pulled the trigger and the plant exploded. Detonated. Seems all that energy it'd been soaking up got concentrated in the seeding mechanism, to scatter the seeds around. Went off like a grenade . . . .

Somehow I survived—and that's more than you could say for the plane, which had dropped faster than Equity Funding shares after the scandal when the plant blew up. Garcia'd survived, too, but was now doing partial penance for his many sins by having to listen to the irate rancher whose land we'd crashed on, wondering who was

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going to pay for this.

I'd failed. The seeds were everywhere; there was no way we could hold it off the market now. Unlimited energy, power, a new Golden Age for mankind . . . . I wanted to cry.

We were both too weak to move when the man from Consolidated Electric drove up and bought the rancher's land, neatly cornering the market on the plant's seedlings. As his Rolls drove off into the distance, Garcia's eyes met mine.

"I've failed," he said.

"I know the feeling," I replied.

"Con Electric will do better than ever." His voice was a funeral whisper. "Nobody'll stop them. If anybody else had that plant mite I discovered . . . ." He shrugged. "But I'm the only one who could breed them, and I haven't got the funds . . . ."

I looked up. Although it was mid-afternoon, I felt the breaking of a glorious dawn.

"I have a plan . . . ." I said. ■

In Times to Come

Next month we are extremely pleased to present the first instalment of The Visitors, a new novel by Clifford D. Simak, with cover and illustrations by Vincent Di Fate. Simak has been one of the foremost names in science fiction for longer than many of us can remember, and he's still going strong. It's good to have him back in these pages. Too often, in stories of alien invasion, communication is established rather casually—or not at all, with the invaders instead wreaking havoc for reasons that don't bear close scrutiny. The real situation, Simak suggests, is not likely to be so simple—it might, in fact, be more like that in The Visitors. Though their story is highly readable, these are some of the most truly alien aliens I've seen, and their effect on human life is, I suspect, like nothing you've read before.

Mack Reynolds is also back, with "The Case of the Disposable Jalopy." Some of the main characters may sound faintly familiar, but it all takes place some time from now, and time, as we well know, brings changes. . . .

There'll also be short stories—as many as time permits—by several other authors.

The fact article, by Walter B. Hendrickson, Jr., is a progress report: "To Jupiter and Beyond." Voyagers 1 and 2 have already passed Jupiter, sending back a wealth of new information, and are now on their way to do the same for other planets still farther from the sun. Mr. Hendrickson reports some of the new findings, as hot off the presses as we can get them, and gives a preview of what we may expect from these probes in the future.

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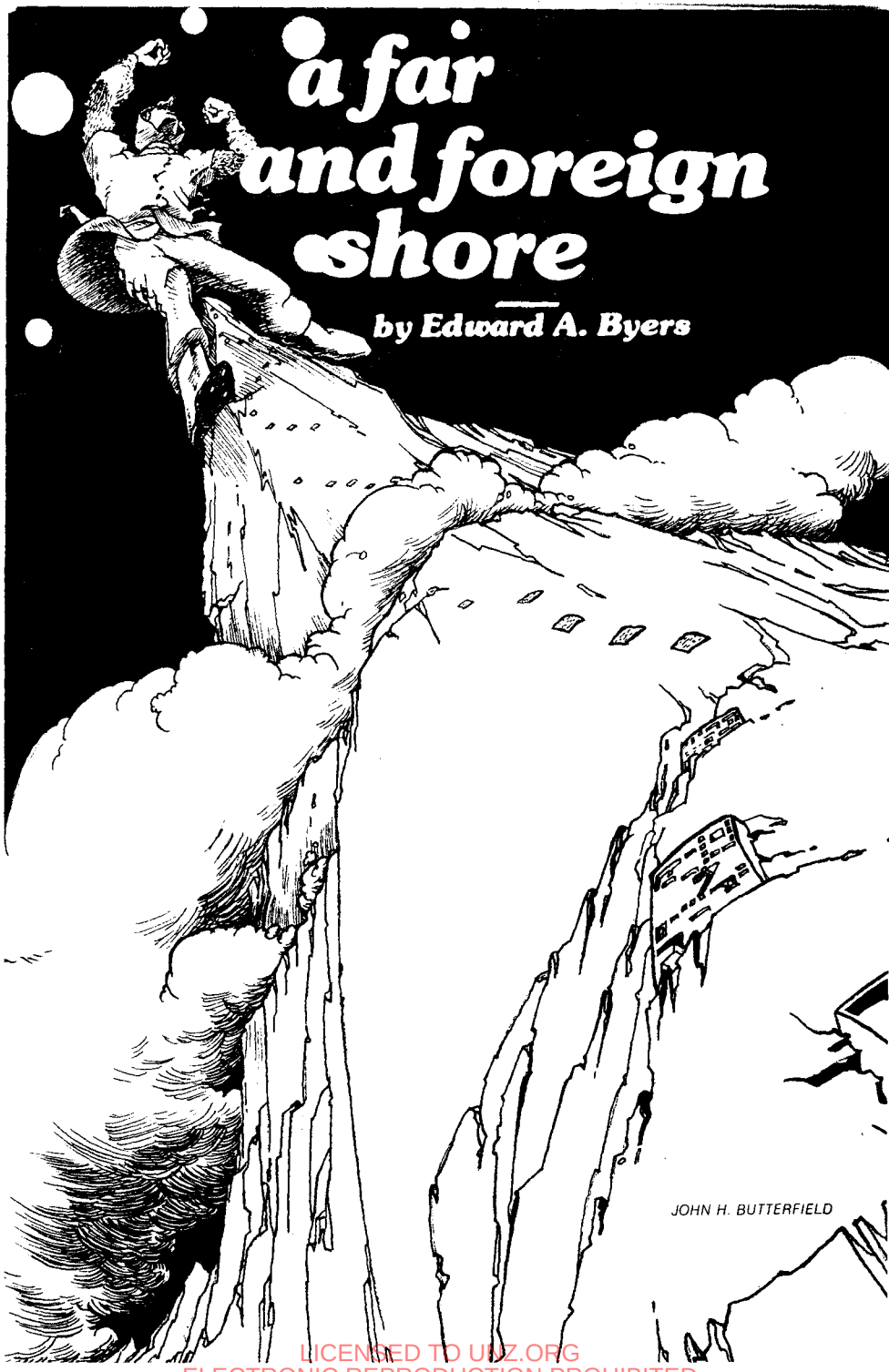

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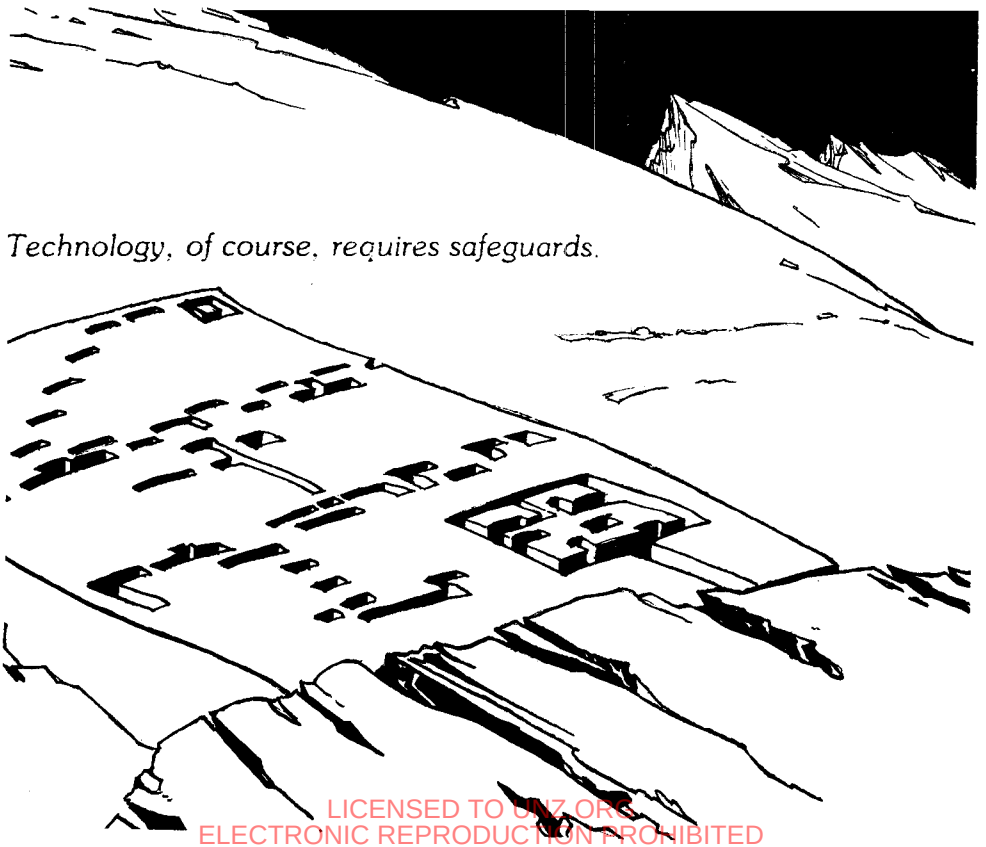

Technology, of course, requires safeguards.

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From the top of Crown Mountain I stood watching Tessler climb. He was on the last slope, a big man dressed in scarlet and black. A pacifist, a peacemonger. The irony caught my fancy—he was a man who wanted me dead.

Tessler looked up and saw me. His face underwent change but he said nothing. He began to climb again, his motions effortless and economical.

Below Tessler the other two climbers came into view. They were struggling, even though I had cut steps and driven in pitons to make it easier for them. The large man, Haskel, wore blue, and his hood had fallen back to reveal sunken cheeks and a scrawny neck. Again the irony caught my fancy. He was a man who was already dead; no doubt he would exchange his death for my chances.

The smallest figure, nearly hidden by Haskel's bulk, moved slowly and cautiously, making use of every handhold. His name was Titus Wilde, though he had a host of others—among them Setsen Dai, an outworlder term that meant The Shining Light.

"Dr. Kirst?" It was Haskel, breaking in on the comm net.

"Yes," I said.

"I'd like to take some interior soundings of the mountain itself. Deep stuff. I brought the equipment with me—it's down at the lodge."

I grinned. "Fine. When you get your soundings, you can compare them to mine."

He grunted and grasped a piton. "I might have known. *Is* there anything inside the mountain?"

"Nothing like you mean," I told him. "Nothing the aliens put there."

They had chosen to climb the mountain, the three of them, though they had all been there before. Not during *melte,* it was true, and not with the mistral trying to pry them off the wall. I shrugged and turned away. It was their choice; I'd taken the floater.

While I waited for them, I turned and studied (for the ten thousandth time) the Crown, which rested atop the mountain like a tiara on a bratty princess—except the mountain was no princess. Massive, the thing measured over twelve feet high and almost exactly six feet thick—a thirty foot semicircle of sculptured steel alloy. As always, it gleamed a soft iridescent pewter; and as always, it maddened me and drew me. It made me weep for gladness and cry in anguished impotence.

It had been built by aliens . . . and it led to the stars.

Zippering up the face of the mountain were the plaques, 990 of them, two foot square, made from the same steel alloy. They were covered with glyphs, cryptic and inscrutable.

I had translated six of them, enough to activate the Crown and turn it into a point of exodus—a stargate.

And therein lay the problem that was driving me mad.

Tessler came over the lip of the plateau and stood beside me.

He said, "The light from the sky, the reddish stone—it makes it seem

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almost surreal." His eyes searched the Crown.

I remembered he'd said something like that the last time he had been here.

"It's real enough," I said.

He took a half dozen steps forward and brought his hand down on the silver-grey surface. It made a sound like a boy slapping mud.

"It's been here about six hundred years," he murmured to no one in particular. "More, and the stone would have weathered down around it."

I didn't correct him. Early in my investigations of the mountain I built a wind tunnel and artificially weathered several pieces of stone. The Crown had been there between a thousand and twelve hundred years.

The mechanics of the thing were simple—almost too simple. Touch plaques in different combinations (during *melte*) and you opened the portal to different worlds.

And it worked. (I humbly stand corrected. It worked—to a point.)

Three of the combinations opened the Exodus Point to uninhabitable worlds, planets that were sterile or barren or choked in poisonous gases. Eight, however, opened the portal to lush green worlds. And it was to those that the aliens had gone.

Dressed in an S-suit, I visited the uninhabitable worlds. At each arrival point I found a single plaque—a method of returning to the Crown.

But the portal would not open to the other eight!

Eventually Haskel and Wilde made it over the lip of the plateau and we stood there like four worshipping druids at Stonehenge, looking at the Crown and saying very little.

Haskel moved around the curve of the portal to the entrance and looked in. Tessler stopped him.

"Easy. It's activated. If you go inside the Exodus Point will open."

"Will it? Haskel asked drily. "It's not set on one of the garbage worlds, is it?" He looked at me.

I shook my head. "No. The code says it should open on a tropical planet. Lots of vegetation." On my way up to the plateau I had leaned out of the floater and touched the proper plaques. The gate was set for the fifth world, the one I called *Verde*.

"Well, then. Isn't this why you sent for us?" He glanced around the group. "Would someone like to join me?"

Tessler moved forward and the two formed an impromptu team. Together they stepped toward the portal's focal point.

I didn't wish them luck. They were unwelcome, even if I *had* asked them there. I realized I was holding my breath and let it out slowly. Titus gave me a strange sobering glance and then turned his attention again to the two men entering the gate.

The Crown flickered as power was pumped from...somewhere. That was all there was. All there *ever* was. Haskel and Tessler stood inside the arc of the portal for a moment longer and then stepped out.

"I felt a slight tingle," Haskel said.

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He turned toward Tessler. "How about you?"

The other man nodded. "A ten volt buzz. A tickle, really."

They all turned to me, as though I had the answer and wouldn't give it up. I returned their look with a flinty one of my own. The mountain might have beaten me, but I was damned if any of *them* would.

Titus broke the silence, his young-old face tranquil, even in this strange setting.

"Pan, do you have any high-speed cameras? I mean, *really* high speed?"

"Yes, I do," I said. "You want to try it again, see if anything shows up?"

He gave me an acknowledging smile and turned away, his attention taken up once more by the Crown.

The wind had begun to pick up, and eddies of left over snow coiled and uncoiled around our feet. The three seemed oblivious to it, busying themselves with measurements and black boxes. Bloodhounds, I thought, on an alien scent. Scholars, sifting the unknown through porous sieves of intellect.

Ah hell!

They were doing nothing I had not done. And done again and again.

I had tried, God knows. All through the previous *melte,* until the snows came and the Exodus Point refused to work at all. Then eight frustrating months until again the winds blew warm against the mountain's flanks. Warm enough to melt the snow and activate the portal mechanism.

When the light began to fade I gathered up the gear and stowed it in the floater. There was not a lot of conversation. There had been nobody shouting Eureka!, no breakthroughs, no solution of elegance.

As we descended, the valley below sought to engulf us, spreading out into huge hollows between the cliffs. I kept my eye on the little row of lodge lights where Rowan would be waiting, his table set for four, and with at least one bottle of ten-year-old brandy sitting on the sideboard.

After the meal, and after the brandy, and after the intolerable hashovers of the day's events, I got up and went outside. The air was cold but clear, and this low in the valley it was still. I could hear the mountain shucking off tons of ice, freeing itself from the sheath of snow and mantle of winter. I looked up; the mountain was a black shadow against the stars, so close I could feel its weight.

There was movement behid me and Titus Wilde said: "How do you see the mountain, Pan? Is it a man...or a woman?"

I didn't have to think about it. "It's an old man," I said. "Gnarled and cantankerous and secretive."

"An adversary, then."

"An adversary."

We were both quiet. Titus Wilde had been my teacher, back in the days before the mountain, before the war, before...well, before everything. He'd taught me languages, and he'd pointed me in the direction of the

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BIOLOG

by Jay Kay Klein

Harry Stine's first published appearance was in this magazine with the May, 1951 issue. He had the cover for a novelette, "Galactic Gadgeteers." These Earthmen hundreds of years into the future managed to win an interstellar war between the Galaxy and the Magellanic Clouds by soldering vacuum tubes and other components into a circuit that would produce never-before-attained square waves. The math, of course, was manually worked out on a slide rule. Looking back, one wonders where these geniuses of the future managed to obtain a supply of obsolete objects.

Since then, Harry has kept his name for serious science reporting and forecasting. Fiction—or as Harry puts it "when I'm just kidding"—is written under the nom de typewriter Lee Corey, a name first appearing in the June, 1953 issue. He had begun writing science fiction in 1944, but really learned his craft from Robert Heinlein who acted as mentor for two years prior to the first sale.

Harry was born in Philadelphia and raised in Colorado Springs, receiving a B.A. in physics at Colorado College. He now lives in Phoenix, making a living partly by article and fiction writing and partly by consulting on high-technology marketing and space industrialization. By trade he is a writer, a rocket engineer, and a professional futurist.

Among the notable happenings in Harry's life, he counts meeting Robert Heinlein in 1950, meeting John Campbell in 1951, and a few years later speaking out for a space program and losing his aerospace job when the Russians launched the first satellite. He does not consider himself a science fiction fan, though he does come to some of the conventions, and should not be confused with the longtime fan of similar name who is now editor of another science fiction magazine.

As an expert witness, Harry has testified before various congressional committees on the future of the space program. He has authored over 20 books, including three science fiction novels, written scripts for industrial films, prepared a score of scientific papers, published more than 200 articles, and obtained three patents. Two recent books from ACE are The Third Industrial Revolution (Revised) and The Space Enterprise. Scheduled for next year is Pocket Books' Living Manual for Century-21.

G. Harry Stine

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glyphs.

He'd been gnomelike then, and he had grown even smaller in the intervening years. He was a mystic. He'd invented a philosophy of sorts, and had even founded a religion—or rather, a religion was founded around him.

He touched my arm. "I am not your adversary. Pan. Nor is Haskel, I think." He peered up at me in the gloom, his face round and smooth and capped by whitened hair.

I nodded, agreeing. "Tell me about Tessler," I said.

"Shall we walk?" he suggested instead. He started down the graveled path to the laboratory I'd built below the lodge. He lagged a little, waiting for me to catch up.

"Tessler is a misfit," he said a moment later. "Brilliant, though. Like you, he graduated at the head of his class. He is a very resourceful scientist." He paused. "He must understand, Pan. He is also a passionate man. And a uni-directed one."

"You mean he's obsessed," I said bluntly.

"If you must. He is dedicated to pacifist causes, and during the Space War, he had to be restrained—he disrupted the war effort."

I grunted. "I met him once—before the war. The first year I spent here. His politics were noticeable, even then."

We reached the lab. Titus opened the door and went in. He looked around with interest at the piled jumble, glyphcasts and stacks of books. With a grin he brushed off one of the two available chairs and sat down.

Then he looked at me soberly. "In some ways, Pan, you and he are polar opposites. He sought to end the fighting; you directed the fleets. Tacticians, both of you, at opposite ends of a spectrum."

"The war has been over for six years," I said shortly.

"Titus shook his head. "For some the war will never be over. But you hadn't allowed me to finish. I have been watching Claude. He hates you, and if he thinks you are getting close to solving this puzzle (he indicated the mountain with a nod of his head) he may try to kill you."

I gave him a sidelong look and sat in the other chair, propping my legs on the cluttered desk.

"Why would he do that—he's a pacifist."

"Because he considers you a sort of monster," Titus said simply. "He holds you responsible for the deaths of millions. It transcends pacifism—he cannot allow you to spread your kind of influence to other worlds."

"He's told you all this?" I went over to the window and looked out, seeing nothing but myself in the black reflected surface. Long pale head, dominant nose, hair in a kind of apostrophe: a monster.

The mystic shook his head. "He didn't have to. It was evident after talking to him for a few hours. You must be aware of it. Why did you send him, Pan? Surely Haskel and I would have been enough."

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I turned to look at him. "He's qualified," I said. "There's Tessler, you and Haskel. The three leading authorities on the aliens and their work here." I shrugged. "He's paid his dues, he deserved the opportunity."

Titus stood up. He touched my arm again. Lightly. Affectionately. "Think, Pan," he said softly. "You are also a brilliant and resourceful person—and a man of passion. Your passion is that gnarled and secretive old man out there. Are you also unidirected?"

When he was gone I prowled around the lab for a while, adding to the clutter, thinking about the mountain. It was possible, I decided finally, that the thing up there did have a better than skin-deep hold on me. With that in mind I turned off the lights, slumped down on the army cot that served me for a bed, and drifted off to sleep.

In the morning, as usual, Rowan woke me up. His voice sounded bright and cheerful over the intercom.

"Good morning, sir. It's just after seven. Breakfast in a half hour—hotcakes, sausage, and biscuits."

I never could turn down Rowan's hotcakes. I stirred myself enough to take a shower and depile my face. While I was dressing I thought some more about what Titus had said. The essence of it had been that Tessler and I were a lot more alike than we were different. I frowned. I *knew* I was dangerous, I had to suppose that Tessler was.

The first person I met was Haskel, already dressed for the mountain. He was standing outside the lodge on the decking, looking up, watching the fog streamers catch at the scrub.

"Dr. Kirst, do you have a moment?" He gave me an appraising look and leaned against the railings.

I said, "Certainly. And we like it informal, here. The name is Pan."

He nodded, smiled briefly. "You were aware, were you not, that I have a rather serious bone disease?"

I didn't hide it. "Mutated tubercule. Very, very nasty. There have only been a few cases. I understand it can be very painful—toward the end."

In answer he reached inside his coat and produced a small rectangular box. It had a dial on it and a row of tiny lights. He gave me a lopsided smile.

"This is the treatment of choice, Dr. Kirst...Pan. The other end of this is set inside my head at a pleasure locus. When I need to neutralize pain I simply adjust the dial."

I didn't say anything. He put the control away.

"I don't mean to be morbid, please understand. The truth is simply that in a few months I will be dead. I would like to request that if there is any dangerous work to be done, any seemingly suicidal mission, that I be the one selected."

I looked at him for a long moment, then turned away. I felt anger. Why ask me to take the responsibility for his life—for his death? After all, what was one more, when there had been

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millions? So tiny a thing, this last little part of himself; surely I wouldn't mind disposing of it. No thank you!

The dial on his unit was already more than half-way around its face.

I mumbled something, and went in to breakfast.

We set up three high speed cameras, two of them looking through the portal entrance, and one peering down from a promontory.

In pairs, we tried each of the eight combinations, resulting in muscular cramp and chilblains from standing in the freezing meanders of the mistral.

All three of them wanted to see the garbage worlds, and I dug some S-suits out of the floater's crib.

"I'm sending you to the first one I visited," I told them. "I needed a name; I called it *Stopover*."

They were gone for ten minutes, then the Crown flickered and they were back.

"Not much there," Haskel remarked affirmingly. "A burnt-out cinder with craters and mountains the color of anthracite. A garbage world."

The film we'd taken covered the light spectrum pretty thoroughly. They were able to see themselves freeze in ultra-violet through to infrared. The single trip to *Stopover* showed instantaneous transfer. One moment waiting, *blip*—good-bye. Then ten minutes later *blip*—hel-lo!

We called it a day half way through the afternoon.

Drinking Rowan's brandy, Tessler said: "It's got to be in the translation, Kirst's missed something."

We were sitting at a table in the lodge's common room. Outside, the twilight hit the top of the mountain, changing the colors to gunmetal. We watched the transformation through the open window, heard the bass-viol of the wind working on the scrub.

Haskel looked up, his cheeks deeply hollowed. "Have you studied it. Claude? Have you taken it apart piece by piece and put it back together again?

"What do you mean?"

Haskel shrugged. He looked at Titus. "He knows. There isn't a false step anywhere in that translation. Kirst's a genius—a goddamn genius!" He broke off and stared past Tessler at the fire roaring on its hearth.

Tessler bit back a reply, shrugged, and refilled his brandy glass. His eyes found mine and burned with their overload of hate. He didn't say anything; he raised his glass in a mocking toast, drank off half of it, hurled the remainder into the fireplace.

"To tin gods!" he said. He stood up, towering and strong, sure of himself. "We'll see about that translation." A little unsteady on his feet, he turned and strode out the door.

The weather next morning was ominous. Colder air had moved in and banner clouds hid the mountain peaks. The wind velocity up at the Crown would be nothing to scoff at.

Haskel wanted to test the electro-

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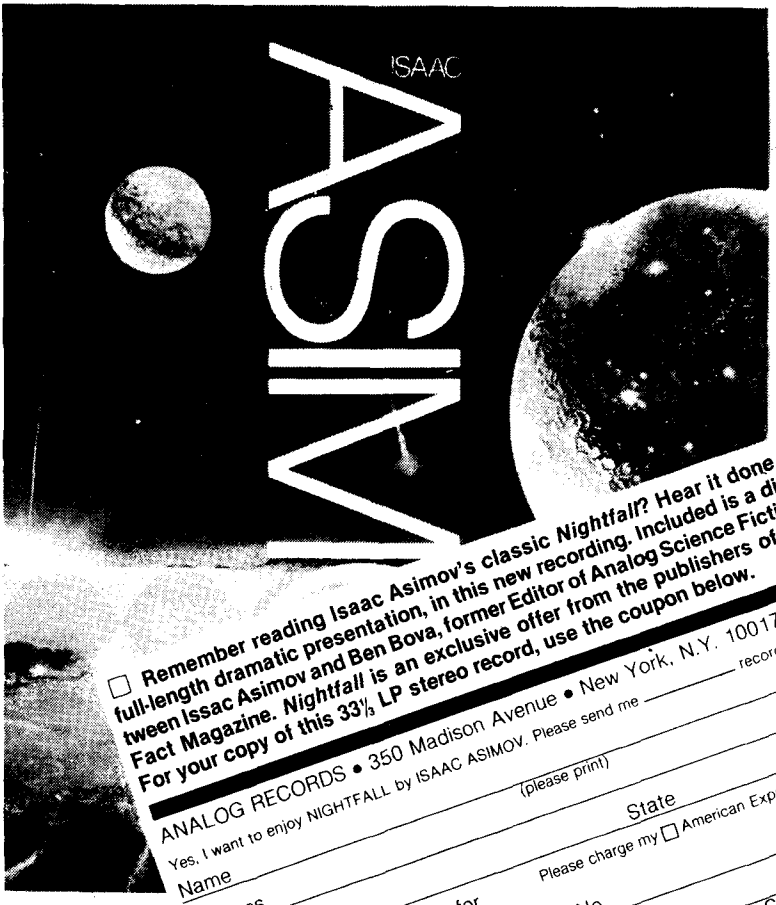
magnetic field strengths all the way up the mountain, and Titus had a theory that the Crown itself might provide an answer to the puzzle. After breakfast I loaded the floater with their equipment and we began our ascent. Tessler did not join us, and Haskel said the light in his room had burned throughout the night.

"He's trying to prove you misinterpreted the glyphs," Haskel said with amusement. "He's a fool."



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I shrugged, and lifted the floater carefully through the first raw currents of the mistral. Anything was possible. And contrary to what Haskel thought, Tessler was no fool. If I had made a mistake, he would find it.

According to my translations, the aliens welcomed others to use the stargate. The instructions for its use were clear. Precise. The keys to the stars were laid out for whoever could divine their use. And the Mountain of the Crown was a beacon few visitors could miss. Wherever they were, the aliens *wanted* to be found.

Our upward progress was slowed by Haskel's efforts to measure the *EM* fields generated by each plaque. It was nearly an hour before I guided the floater over the lip of the plateau and set it down a few feet from the Crown.

This far up, the wind was a caterwauling tiger, awesome in its strength. I linked life lines with Titus and Haskel before letting them leave the floater. I had once clocked the mistral winds at 110 miles per hour, and I was taking no chances of losing my charges over the edge of a 10,000 foot mountain.

"Pan?" It was Titus's voice, shrill against the storm.

"Yes?"

"It occurs to me that the portal may be closed at the *other* end—and not necessarily by the aliens who built this..." he pointed to the Crown.

I thought about it while he took his readings.

"I don't buy it," I said when he clambered back into the floater ahead of Haskel. "One planet, perhaps. Two, even—or three. Eight stretches the theory too far."

He glanced at me. "It could be the descendants of the original builders. A few centuries can make a large difference in world views. Consider mankind."

Lifting the floater up into the wind, I considered.

It was morning...it was *a* morning. I sat up groggily and listened to a cascading rain pelt against the windows. The intercom buzzed insistently.

"Good morning, Dr. Kirst. It's seven o'clock. Breakfast in a half hour."

"Rowan?"

"Yes, sir?"

"You're fired."

I heard a chuckle as the intercom clicked off.

There was a calendar on my desk and I looked at it as I dressed. Nine weeks. Nine weeks, and we had done everything but dismantle the stargate. In another three or four the snows would come, and we could forget the whole project for eight months.

Damnation!

I stepped outside the lab and looked up. The mountain was a patchwork of browns and greys and reds. The rain and dim light lent it a dignity it didn't deserve. Squinting against the pelting droplets, I could just make out the line of plaques marching up its face. I felt an old seething anger. It was as though the mountain were laughing at me,

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hiding its secrets in plain sight.

Because of the rain, I went into the lodge through the rear. I was entering the common room through the kitchen when I made out two voices. Haskel and Tessler. They were talking about me.

"...a murderer, Joe!"

"No, he was a tactician. If it had not been for him and others like him the Earth would own everything now. Earth had tacticians, too, don't forget." Haskel's voice sounded slurred, distant.

"Why do you stick up for him? Do you want to see him pollute an alien race with his...his...*infection*?"

"Stow it, Claude! That's pretty strong." Haskel had roused himself, though he still seemed curiously insular.

There was a brief silence, then Tessler said: "Do you actually think he'll find a way to make the stargate work?"

"Sure. He's not just smart, you know. He's mule stubborn, too. He'll keep worrying it until it gives or he does. It might not be *this melte* cycle, or even next, but he'll do it. He can make book on it. Look at that translation he did—impossible, right? Eleven years it took him, but he did it. He'll lick the stargate, too."

I didn't stay to hear any more, retreating instead back through the kitchen, where I took the opportunity to steal a sandwich and a quart of milk.

It wasn't true—I *had* given up; I'd sent for help.

Three days later Tessler tried to kill me.

This late in *melte* the wind's velocity had dropped considerably, though squalls still swept across the Crown. When they hit it was with force of waves crashing against a cliff, and they gave no warning. It was early afternoon; I was laying down cables for another camera run.

It occurred to me that there might be more than one locus of departure. One locus for garbage worlds, one (or possibly more) for the other eight.

I was getting the proper angle for number two camera when Tessler came over the lip of the plateau. He had obviously climbed all the way; the floater was parked a dozen feet away in the lee of an outcrop.

"You're just in time to lend a hand." I said amicably.

He stood up. He was wearing his scarlet and black coat, and he looked awesome silhouetted against the sky.

He said. "I didn't come here for that." He was carrying a piton gun in one hand. As he spoke he swung it up to cover me.

A piton gun is used by climbers. Positioned properly, it will drive a ten inch chrome alloy spike into almost any kind of stone. I didn't care to think of what it would do to me.

"Stand up!"

I stood up, easing my legs. Tessler's face was bleak. Empty. Devoid of expression.

"You won't contaminate *them*." he said stiffly. "I'm going to make sure you don't."

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I remembered Titus' warning. Tessler must think I was getting close; he'd come to kill me. I activated the comm net. At least there would be a record of what was happening.

He motioned with the gun. "Over there!" I moved slowly along the curve of the Crown and he followed, his eyes never leaving my face.

"It won't stop with me," I said as evenly as I could. "Someone else will find the key."

He nodded shortly. "Of course. And then mankind can meet with the aliens. But on even terms."

I stopped. I had gone as far as I could along the arc of the Crown. I was at the entrance, and I knew suddenly what Tessler was planning. I looked back at him and anger flared inside.

"Which garbage world did you set it for, Tessler?"

He shook his head and his mouth drooped. Apparently he was not enjoying the act as much as he thought he would.

"Go on," he said. "Step inside."

I waited, and he shoved the piton gun at me, holding it rock steady just inches from my chest. Titus had been right—he hated me enough to put aside his beliefs. Those millions of deaths were mine to answer for . . . and he was to be my executioner.

Damn!

No ideas, Pan? And you call yourself a tactician. Hah!

Maybe . . .

I suddenly grinned, a mocking expression that made his eyes narrow.

"Do you want the secret of the stargate, Tessler? I'm close enough to guess the answer." I took a half-step back "I know the way to the stars . . . shall I tell you, or shall I take the anwer with me?"

It stopped him. We stared at each other for perhaps a minute, and then he shook his head.

"No. You may be close, but you don't know . . .not yet. Goodbye, Kirst."

I had held him long enough. The squall struck with the force of a cresting wave, whirling him partly around. He braced himself against it. I aimed a kick at his wrist and missed, and felt the rush of air as a piton swept over my shoulder.

There was no grace to it. I tackled him, and we rolled back and forth in front of the Crown. He was strong, and he fought with a desperate intensity. I managed to knock the piton gun away from him and we both struggled to our feet.

I said, "Don't be a fool, Tessler. I don't want to hurt you."

"No," he said. "It's you! You kill everything you touch." He leaned down and picked up one of the camera tripods. He rushed me.

As he closed, I reached out and grasped his coat, let myself fall, got my legs under him, and catapulted him over my head. He landed inside the portal. For an instant the Crown flickerd, and by the time I managed to straighten up the gate was empty.

I waited. It was no more than ten steps to the return plaques on any of

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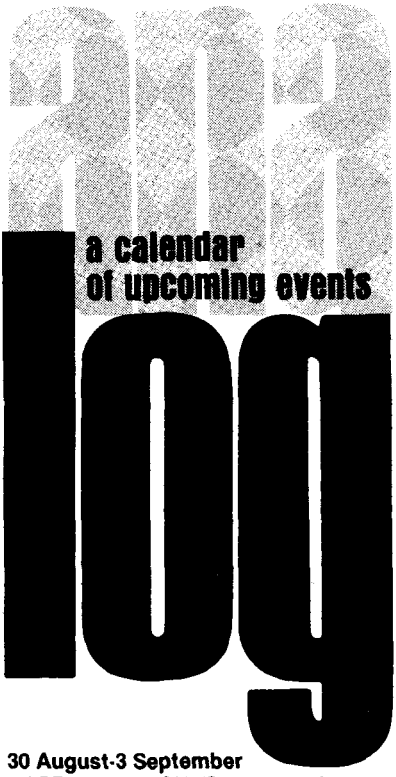

30 August-3 September
NORTHAMERICON (Second NASFiC) at Galt House, Louisville, Ky. Guest of Honor—Frederik Pohl, Fan Guest of Honor—George Scithers. Toastmaster—Lester del Rey. The second North American SF Convention. Registration $15 until 30 June, $20 thereafter and at the door. $7 non-attending membership. Art show, hucksters. Info: NorthAmericon, Box 58009, Louisville KY 40258.

31 August-3 September
SYNCON '79 (Australian SF conference) at Sydney, NSW. Info: Syncon '79, P.O. Box J 175, Brickfield Hill, NSW 2000 Australia.

4-7 September
CompCon Fall (IEEE Computer Society) at Washington, D.C. Info: Harry Hayman, Compcon Fall '79, P.O. Box 639, Silver Spring MD 20901.

17-19 September
OCEANS '79 (Oceanographic conference) at San Diego, Calif. Info: R.H. Gautier, 4455 Monaco St, San Diego CA 92107.

24-26 September
Instrumentation in Aerospace Simulation Facilities International Congress (AES) at Naval Postgraduate School, Monterey, Calif. Info: Henry Oman, Boeing Aerospace Co., Box 3999, Seattle WA 98124.

28-29 September
ROVACON 4 (Tidewater area SF conference) at Northside High School, Roanoke, Va. Guests of Honor—David Gerrold and Karl Edward Wagner. Special guests—Nelson Bond, Paul Dellinger, Thomas Atkins, Richard Dillard. Registration $1.50 in advance or $3 at the door. Info: Ron Rogers, P.O. Box 774, Christiansburg VA 24073.

28-30 September
OTHERCON III (SF conference) at College Station, Tex. Guest of Honor—George R.R. Martin. Registration $8 in advance, $10 at the door. Info: Sven Knudson, Box 3933, College Station TX 77844.

28-30 September
Northeast Computer Show at Boston, Mass. Info: Northeast Expositions, P.O. Box 678, Brookline Village MA 02147.

13 October 1979
Deadline for entries in NESFA SF Short story contest. Write for contest rules to NESFA, P.O. Box G, MIT Branch PO, Cambridge MA 02139. Do not send stories before getting rules.

ANTHONY LEWIS

Items for the Calendar should be sent to the Editorial Offices, **four months** *in advance of the issue in which you want the item to appear.*

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the garbage worlds. Even without an S-suit he could have made ten steps—it was possible.

I waited...

Haskel said, "The engineering part of it—it doesn't make sense. There's so little energy given off the gate wouldn't power a flashlight."

It was the tenth week of *melte,* and so far we had solved nothing. We had lost one of our number, and were in danger of losing a second. Haskel's features had thinned to the point of emaciation, and his skin had acquired an unhealthy yellowish color.

"What if the gate gets its energy from...the other side?" Titus inquired gently.

Haskel shook his head. "There's nothing on the garbage worlds that could generate power."

I looked at them both. "We're casting at shadows. We don't know the amount of energy required. It could be very little."

Titus stood up, walked to the fireplace, and stared at the ashes with his hands clasped behind his back.

"You still think they *want* to be found?" He glanced around at me, his pixie face worrying something.

"Don't you? It's not as though they were hiding anything. The mountain, the Crown—it's all there in plain view."

Haskel got up slowly, hands grasping the arms of his chair. He gave me a ghost's smile. "When you figure out a new plan of action, call me. I'm going to lie down for a while." He moved on leaden feet into the darkness of the hall.

When the phone buzzed I was on my third glass and it was well after midnight. I sat the glass down carefully and lifted the receiver off the hook.

"Yes?"

"Pan...Dr. Kirst. I'd like your help." It was Haskel, and he sounded tired. Not in pain, just tired.

"Can it wait until morning?"

"I don't think so."

"All right, then. What is it?" I was suddenly wide awake.

"Come up to the lodge," Haskel said slowly. "I doubt if I could make it to your laboratory."

I found him standing at the lodge entrance. His body was bowed and his face was a white wedge against the dark.

"I'd like to go up the mountain," he said. His voice was reduced to a whisper. He tried a small smile and immediately looked as though he regretted the effort.

I took his arm. "Look, let me put you to bed. We'll take you up the mountain in the morning. You can't see anything now anyway—it's dark."

"Please..." he held out the rectangular box. The dial was all the way around to full. He had no more tomorrows; they were all used up.

"Wait here," I said without expression. "I'll get the floater."

As we began our ascent, Haskel touched me gently on the shoulder. "I never did ask: what are the names of the other two garbage worlds?"

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"Charon. Aleta."

"Charon I understand. Who was Aleta?"

"A woman I knew," I said. "It doesn't matter."

"Do they have stars overhead?"

I thought for a moment. "Charon does. It seems to be located right in a cluster."

"Then please. That's the one I'd like to visit." He again gave me his skeleton smile.

When we reached the Crown he didn't hesitate at all. He simply walked forward until the portal swallowed him up. At the last moment he looked back, as if to say something, and then he was gone.

Blip!

I found myself wishing there *had* been stars over Charon.

Melte was ending. On the mountain the ice was gone. The plaques stood out in stark relief against the ochre stone.

Time dragged, but the season raced.

"What are you going to do now?" Titus asked.

"I don't know. Survive the winter, try to generate a new plan of attack." I looked at him and shrugged. I didn't like to think of it.

Outside the lodge the sunlight was failing. The wind, once proud, barely riffled the mountain scrub. Titus stared at me in tranquil sobriety and sipped tea from a plastic mug. For the past week he had been researching my translation of the plaques. He'd found nothing major to disagree on.

"Pan," he put down his mug, "do you see the aliens as adversaries?"

"What? Yes, I guess I do." His face in the gloom resembled that of an owl, round and wise and somehow nocturnal.

"Isn't that a paradox? As adversaries they would hardly invite other races, other *life forms*, to use the stargate. Yet the instructions are clearly defined, and strangers are welcomed."

"There isn't any paradox," I said. I grinned at him. "They're adversaries because they're a problem. As the mountain is an adversary. As it will be until I defeat it."

"Perhaps . . ." he paused, and then went on softly, "*we* are the adversaries."

"What do you mean?"

"I'm not sure yet. It will require some thinking about." He stood up and prepared to go. "Will you get a new team—for the coming *melte*?"

I shook my head. "No point. They'd all be second-raters."

"I see." He touched my shoulder. "Good night."

"Good night." I said, and sat in the gloom until Rowan came in and found me.

In the morning I made coffee on one of the burners in the lab. I didn't feel like going out. Besides, I had no plans, no expectations; I had no abiding hopes. I laced the coffee liberally with brandy and sat sipping it, watching the colors emerge up on the mountain.

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So I lost the fall. Two out of three?

The itercom buzzed.

"What is it?"

"Sir, Mr. Wilde said I should inform you that he has taken the floater to the top of the mountain."

"Well, he can bring it down again when he's ready," I said. I sipped my coffee, wondering what he was up to.

It was an hour before I wandered up to the lodge. Rowan set out breakfast and handed me a tapedex.

"Mr. Wilde said you would be interested in this, sir."

Munching a slice of buttered toast, I dropped the tapedex into a playback unit. The screen cleared and Titus looked out at me. Tranquil. Wise. At peace with himself and the world.

"Good morning, Pan. By the time you see this I will be up at the Crown. I think I know now what makes it work."

I dropped the toast and didn't notice the smear of butter on my lap.

"I wondered why the aliens would invite us to use the gate," Titus continued, "and then shut the door so firmly. Why would they welcome us with one hand and deny that welcome with the other?

"I think the answer lies in simple self-preservation. The aliens want badly to make contact with other beings, but not at the risk of being attacked. Think, Pan—the lighted windows of a farmhouse welcome the traveler, but the doors are closed to wolves.

"The gate must have a filter, a sensor, that picks up latent predatory instincts. Instincts that Man has in full measure. The windows welcome us, Pan, but the doors shut us out. We are the adversaries. *We* are the wolves."

Titus was silent for a moment, his round face peering solemnly out at us from the tank. Then he spoke again.

"I'm going up on the mountain. I'm going to meditate, and clear my mind, and try to be deemed sufficiently civilized to pass through the stargate. To *Verde*, I think. Wish me luck, Pan."

The tapedex stopped. I sat staring at the empty tank.

Kee-rist!

It was afternoon by the time I reached the plateau. The floater was packed by the outcrop, but there was no sign of Titus. There was a damp wind blowing. A south wind, heralding the end of *melte*.

With something akin to . . . what . . . trepidation? Anger? Jealousy? I followed the arc of the Crown around to the entrance.

It too, was empty. Except, I thought, for ghosts. I stepped in and looked about. There was a small branch of green at the locus point, with a small blue flower on it. The petals were already curled, wilted from the cold.

I stayed up there for a long time. Hours. Until darkness came.

Until I could grin again.

A wolfish grin.

On my way down the mountain the first snows of the new season began gently to fall upon my shoulders. ■

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Ernie

There's a lot you can do with a big talent. But what do you do with a little talent?

by Timothy Zahn

JEFFREY TERRESON

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The first time I ever saw Ernie Lambert was on that sweltering August day when he showed up at my tiny office in the Athlete's Club and asked if he could join my boxing team.

"Sure," I told him; "It's not really a team, you know, just a bunch of kids who like to box. You ever box before?"

He nodded. "Yes, sir, I used to fight all the time in St. Louis, before we moved down here." His voice was the careful English of a kid trying to break free of a ghetto accent. "I was hoping you could teach me enough in the next few months so I can get in the Golden Gloves tournament."

"Well, we'll see what we can do. I suppose I ought to tell you, though, that I'm not a real boxing coach. I teach gym at the high school and I haven't boxed in competition since college."

"That's okay. My last coach wasn't a pro, either."

"Fine. Just thought you should know." I glanced at the clock and continued, "Some of the other guys will be in pretty soon to do some practice sparring. If you want to suit up, you'd be welcome to join us."

"Yes, sir, thank you."

Eight other guys eventually came in. I told them to do their own warm-up exercises, partly because that's easier on me and partly because I wanted to watch Ernie. No doubt about it, he had had some good coaching in the past. He knew all the standard exercises and a couple I'd never seen but which made sense once I stopped to think about them. He seemed in pretty good shape, too, and it looked to me like he was eager to get into the ring. That was starting to worry me a little. It wasn't because he was black; three of my twelve fighters were black and that never caused any problem. But Ernie was the smallest guy here today, outweighed by ten to fifty pounds, and I didn't want him to get run over on his first day. I hoped he would see that and have the sense to stay off the canvas.

He either didn't notice, which is bad, or didn't care, which is worse, because after Ray and Hal had finished their bout Ernie asked to have a turn in the ring. I wished I could say no, but I'd already sort of told him he could and I couldn't go back on my word. The only guy even close to Ernie's size was Chuck, who still had ten pounds and an inch or two on him. But there was no help for it, so the two of them put on the head protectors and oversized practice gloves and got in the ring together. Holding my breath, I tapped the bell.

Ernie demolished him. I mean, completely.

It was the strangest fight I'd ever seen. Ernie didn't seem to be particularly fast, but halfway through each punch there was this wierd little *jerk* of some kind, and suddenly that hand was behind Chuck's guard and was bouncing off his head. At least three out of five of those jabs were landing, which was ridiculous for someone as good as Chuck. And on top of that, Chuck's own punches weren't connecting with anything except air, because that jerk of Ernie's

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was as good for getting his head back as it was for getting his fist forward.

The whole thing began to get to Chuck in the middle of the second round and he started throwing everything he could find, so I had to stop the fight. But I 'd seen enough. I had a real Golden Gloves contender on my hands in Ernie.

It took the other guys awhile to see it, and awhile after that to see what it might mean in prestige for the whole town, but they eventually figured it out and from then on Ernie was one of the gang. At the end of the session Chuck announced that everyone was chipping in to buy Ernie a soda at the drugstore, and they all trooped off together. Me, I went home and startled my wife by telling her we were going out to dinner.

The next few weeks went by quickly, kind of suprising when I looked back at all the work I'd done. My gym classes at the high school took up a lot of my time, except for the two weeks between summer school and the fall quarter. Ernie was kept pretty busy with studies himself, and so we didn't work out as much as we had before. But every minute that I could get Ernie and at least one other guy together I spent at the Club. For a while I worried that I was neglecting the other guys in my work with Ernie, but Ray told me that they were getting more from my coaching, now that I was really fired up, than they ever had before. Ever since that day back in college when I broke my wrist and had to drop out of the boxing team, I'd really wanted to get a shot at working with real champion material. I guess my excitement was just boiling over.

And gradually I got to know Ernie.

The last of five children, he grew up in the St. Louis ghetto area. His father didn't earn too much money, but Mister Lambert must have put a lot of time into raising his kids, because Ernie seemed better adjusted than a lot of richer kids I've known. He was about average height and build and sort of plain-looking, and he wore his hair short instead of in one of those Afros. He was soft-spoken and polite, and though I finally broke him of the habit of calling me "sir," he never called me "Ron" like some of the others did. It was always "Coach" or "Coach Morrissey."

He was smart, too, especially in the math and business classes he was taking. His teachers told me they thought he would get straight A's in those courses if he didn't spend so much time at the Club. That bothered me a little, but I decided it was my duty to develop the boy's talent. That's what I told myself, anyway.

About a month and a half after Ernie's arrival in town we got a real nice break. One of the local banks closed its lobby for remodeling, and I managed to talk them into loaning me one of their videotape cameras for a few days. I set it up at the Club and announced to the guys that they were going to get to watch their own fights, just like the pros do.

Everybody seemed pretty enthusiastic about the idea. Everybody, that

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is, except Ernie. He was sort of nervous, and kept looking at the camera while the others were sparring. And once in the ring, he got clobbered, the first time I'd seen that happen. His timing was shot to pieces, that whiplash *jerk* gone completely. I had to stop the fight after two rounds. Ernie wouldn't say anything about it except that the camera must have made him nervous.

The camera went back after four days and Ernie became dynamite in the ring again. But it bugged the heck out of me. Ernie was good, sure, but he still had flaws and I just knew it would help him to be able to watch himself in action on film. In *real* action, I mean; not the bum show he had given before for the camera.

It finally bugged me to the point where I did something about it. The videotape camera was back at the bank, but I had an old movie camera of my own. Taking it to the Club, I set it up where it wouldn't be seen or heard from the ring. I figured that what Ernie didn't know about couldn't make him nervous.

Sure enough, the next day Ernie did his usual good job in the ring. After everyone had left I took the film out of the camera and hurried home with it. Wolfing down my dinner—Diane complained about that—I went down to the basement and set to work developing the film.

It came out beautifully. The camera had been close enough to the ring that the fighters sometimes stepped out of its range, but there were some really clear shots, too. Ernie's whiplash punch was there in all its glory; so were a couple of his fast ducks and side-steps. My projector was an expensive model, a gift from the in-laws, and it had three speeds and even a single-frame viewer. So after I watched Ernie go through his paces a couple of times, I backed the film up and watched one of his whiplash punches in slow motion.

It didn't look much different. That wierd little *jerk* halfway through the punch was still there, just as impossible to see as at regular speed. Using the slowest speed didn't help any more.

That was strange.

Now my curiosity was aroused. Moving the reels by hand, I got the film set to the frame just before the jerk. I took a good look at where Ernie's fist was in relation to the background and then moved the film one more frame.

No doubt about it, that fist had moved. But, then, it moved in every frame. Naturally. So what was the jerk I kept seeing? I puzzled over those two frames for several minutes before it finally hit me.

Ernie's whole body had moved forward a little. His *whole* body, even his feet, which looked to be solidly planted in the canvas.

Now that struck me as a little strange, because you can't just move forward without leaving your feet on the ground to push with. I figured I must be missing something, so I took a look at the other shots I'd got of Ernie punching or ducking. Every one of

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them, the same way. He'd be *here* in one picture and *there* in the next. Not much, maybe a couple of inches or less each time, but enough to see if you were looking for it.

I puzzled over it for the rest of the evening, but couldn't come up with a good answer. Maybe Ernie could give me one.

"What did you want to see me about, Coach?"

"Sit down, Ernie. The rest of the guys gone?"

He nodded, sweat still trickling down his face from the workout I'd just put them through. Pulling the single guest chair in the office close to my desk, he sank into it.

"Ernie," I said, "I have a small confession to make. Remember how you didn't like the videotape camera we used a couple of weeks ago? Well, I figured it was just some kind of stage fright that was bothering you. So yesterday I hooked up my movie camera without telling anybody and got some film of you sparring with Jess."

Ernie had quit breathing. After a little while he seemed to notice that and took a careful breath. His face—well, *scared* didn't really fit it. Maybe *wary* did.

I went on, "I'm a little puzzled by something on that film. That little whiplash *jerk* in your punches looks sort of strange. I thought you might explain that to me."

"Gee, Coach, I jist swing an' m' body does the rest." He seemed to realize his English was slipping and stopped for a second. "I guess I don't really think about what I'm doing," he finished.

I shook my head. "Sorry, Ernie, but that won't wash. Whatever it is you do, you know about it, or else you wouldn't have stopped doing it when the other camera was on you."

He looked like a cornered animal. "You wouldn't understand," he muttered. "You'd think I was a—a freak."

"Try me. Look, if I'm going to coach you properly, I have to know all about you. If you want, I'll give you my word I won't tell anybody else."

For a long time he just sat there, looking down at this hands folded tightly in his lap. "All right," he said at

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last. "Coach, have you ever heard of teleportation?" When I shook my head, he went on, "You read about it sometimes in those science fiction books. It's when you go from one place to another, like, in no time at all."

"All kinds of crazy stuff in those books. So?"

"Well, that's what I do. I can 'port about an inch at a time, and I do it when I'm hitting or ducking a punch. It's just enough distance to throw off the other guy's timing, usually."

I just sat there, wondering if he was putting me on. He must have seen that in my face somehow, because his eyes started looking wary again. "You don't believe me," he muttered.

"How about giving me a demonstration?" I suggested. "How fast did you say you could . . .teleport?"

"I can move an inch at a time, but I can do it five or six times a second if I need to." He stood up, pushed the chair against the wall, and faced me across the table. "What direction do you want me to go? Front, back, or sideways?"

I stood up, too, so I could watch his feet. "How about going a couple of feet to the left and then a foot backwards? Any more and you might wind up going through a wall."

"Can't. If there's anything solid in my way I can't 'port in that direction. I can't go up, either, and going down makes me real hot." He took a deep breath. "Here goes."

It was the damnedest thing I'd ever seen. You know those cartoons on TV that they make by taking a picture of something, moving it a little, and taking another picture? Well, it was just like watching one of them. Ernie sort of jolted his way around the room without ever moving his feet—in the usual way, I mean. It was really wierd to watch him doing it.

When he was finished he pulled the chair over again and sat down, looking suddenly very tired. I sat down, too. My legs felt just a little weak. "How did you ever learn how to do that?" I asked.

"I don't know, Coach," he shrugged. "One day when I was thirteen I just . . . *did* it, I guess, and from then on it was easy."

"So you've been doing this for, what, three years now? Does your family or anyone else know about it?"

"No. At first I was just . . . I was just too *scared* to tell anyone. It took me months to find out the name for it, even, and when I found out that people thought it was a make-believe sort of thing, I figured I'd better keep my mouth shut about it. I did try to tell my brother once, but he wouldn't listen. I don't know, maybe my family knows but just won't talk about it."

That I could understand. "I'm a little surprised you're willing to risk boxing," I said. "I mean, this teleporting thing has got to be in your brain somewhere. You get hit too hard in the head and you might lose it."

"Coach, I wouldn't be boxing at all if I couldn't 'port. I figure I might be able to get to be a pro now."

That startled me. I had had no idea he was that serious about the sport.

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"Ernie, pro boxing isn't for you. It's a hard way to earn a living, and there are a lot of crooks to watch out for. Besides, with your brains and that wild talent of yours you shouldn't have any trouble making it in life."

" 'Wild talent,' huh?" Suddenly Ernie looked bitter. "Coach, what do you think I can do with my 'porting that'll make me any money?"

"What do you mean?"

"I mean this is the most useless 'talent' that anybody's ever seen. There's just nothing I can do with it. Except fight."

"Aw, come on. There must be hundreds of things . . ." My voice trailed off as I tried to think of somewhere 'porting would come in handy. "Well, look, just because I can't think of something off the top of my head doesn't mean there isn't anything."

He shook his head. "I've been thinking about it for three years, Coach. It's really useless."

"Okay, suppose that's true. There's still no reason you should have to fight for a living. I know you're good in math and some of your business classes. Accounting, or something, would be a good job for a guy like you. Pays pretty good, too."

"No," Ernie sat up a little straighter in his chair. There was a glint in his eye. "I don't want to be some—some cog in a bog company somewhere. I want to *be* somebody." He leaned across my desk, half defiant, half pleading, his usual polite reserve gone. "Coach, I've been a nobody all my life. I've been pushed around and looked down on and treated like garbage, I'm tired of it. I'm gonna make a name for myself. People are gonna call me 'sir,' not 'boy,' and they're gonna treat me with respect. I'm gonna *be* somebody!"

He was almost shouting, and must have suddenly realized it, because he quit talking and settled back in his chair.

"The only kind of respect that's worth having is the kind you have to earn," I said. "And as for being *somebody*, Ernie, it's not the name that counts but the guy who wears it. There are a lot of guys on assembly lines who are better men than any pro boxer that ever lived."

Ernie shook his head slowly. "I wish you could understand, Coach. But I'm going to be a pro anyway. If you don't want to help me, I . . . guess I'll just have to do it on my own."

"If it means that much to you, I'll keep working with you," I said after a minute of hard thought. "But I want you to keep an open mind about other possibilities, okay?"

He hesitated, then nodded. "Okay. And . . . please don't tell anyone about my 'porting, all right?"

"I promise. See you tomorrow?"

"Sure thing. Good night, Coach. And thanks for listening."

I thought about it all the way home and for most of that evening. Ernie was right: I couldn't come up with a single solitary job where 'porting something an inch at a time would be worth doing. It was slower than walking and no good for going through

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walls or working in tight places. I didn't know how much other stuff he could move with him when he 'ported —he told me later he could move practically anything as long as he was touching it—but even that didn't help any. It would be faster to jack up a ton of steel or whatever and roll it on wheels instead of 'porting it around. Especially since he couldn't 'port things upwards.

I didn't get to sleep until after two, and when I woke up the next morning I felt almost hung over, I was so tired. Diane told me I had muttered in my sleep all night and had rolled around so much I'd almost pushed her out of bed. She want to know what was wrong, but of course I couldn't tell her. She didn't like that much.

Most of the rest of the day was pretty hazy, but I managed to get through my classes somehow. I woke up enough to spend a good hour in the Club with Ernie and the other guys.

Now that I knew how much Ernie wanted to be a pro boxer, I could see the quiet sort of determination he took into the ring with him, and that grit paid off in the next month or so as he moved towards becoming a really top-notch fighter. His speed and strength increased, and his reflexes got so good that he almost didn't have to 'port anymore. Which was just as well, since the other guys were learning how to handle his whiplash punch, even though they didn't know how he did it. Actually, Ernie's style was even deadlier now that he didn't *have* to 'port because you could never tell whether that extra inch would show up or not. It raised hell with your timing.

All the other guys were getting better, too, which didn't surprise me any, because if they could handle Ernie they could handle anybody. At least one of them was good enough already to go to the Golden Gloves and give a good account of himself, and the others weren't very far behind. As their coach, I should have been happy. But I wasn't.

That talk I'd had with Ernie all those weeks ago was still bugging me. The more I got to know him, the more I liked the kid and the less I liked the idea of him going pro. Sure, he was good, but at a hundred thirty-five pounds he was only a lightweight, and he would never be more than a middleweight unless he did a lot of growing in the next few years. A good middleweight could make money, all right, but it was the big heavyweight champs that got most of the publicity that Ernie seemed to want so badly. He stood a far better chance of winding up disillusioned than famous, it seemed to me. And I hated to see him go through something like that. He was too smart, too polite—hell, he was just too *nice* for that.

And, as I watched Ernie getting better, my conscience started bothering me in the other direction, too. Namely: was it fair of me to turn Ernie loose on boxers who didn't know what they were up against? Just because the official rules didn't forbid 'porting—big surprise—that didn't mean it was

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ethical. It gave Ernie an unfair advantage, really, because I was pretty sure a boxer could watch Ernie's whiplash punch for a month from ringside without figuring out how to stop it. You had to actually get into the ring with him, and by then it was too late. Did I have a duty to the rest of the boxing world?

The really maddening thing was that there was a clear way out of this mess. All I had to do was find some other way for Ernie to become successful and respected by using his 'porting talent. That's all. But I couldn't come up with one to save my life. Nothing in industry worked, and the professional-type jobs were even worse. I tried to find another sport that Ernie might go into, but he was too small for football or basketball and I couldn't see how 'porting would help any in baseball. All I could possibly come up with was the idea of letting some scientists study him to try and learn how he 'ported, and I knew Ernie wouldn't go for that.

I finally gave up the effort. Ernie had at least twenty IQ points on me, and if he hadn't been able to find anything else to do with that 'porting trick in three years I figured I was probably wasting my time.

Something had to give here, though. Much as I wanted to see one of my students become a real champ, I couldn't keep coaching Ernie if I didn't think it was good for him. It wasn't fair to him, and it wasn't good for my stomach, either. I made up my mind to have another talk with him as soon as I got a good chance.

A day or two later I got my opening. Driving away from the school after classes on the way to do some errands, I saw Ernie walking along the road. Pulling alongside him, I called, "Where you heading, Ernie?"

"Down to the river, Coach. I'm meeting Jenny there."

Jenny Cooper was his latest girlfriend. She was a nice kid, except that she didn't care much for boxing. "I'm going that direction," I said. "Want a ride?"

"Sure, thanks."

He got in and we started up again. "What are you and Jenny going to do down there?" I asked him.

He smiled. "She says that an Indian summer day like today is too good to waste, so we're going to have a picnic supper under the cliff."

"Good idea," I agreed. "I wish I'd thought of that myself."

"I wanted to go to the Club this afternoon," he continued. "But I guess I can skip one workout without softening up too much."

I cleared my throat. "Actually, Ernie, I'd like to talk to you about that."

It took me most of the five-mile trip to explain the conflict between what Ernie wanted and what I felt was good for him. He waited in silence until I had finished.

"Are you telling me you won't help me train anymore, Coach Morrissey?" he asked.

"If you're really determined to be a pro boxer, my coaching isn't going to help or hinder you much," I said. "I

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give you as much help as I can, Ernie, because it wouldn't be fair to you to do anything else. But I had to tell you all this so you'll understand if I'm not as fired up as I was a couple of months ago. Also, I guess I wanted to try one last time to talk you out of going pro."

"Have you thought up anything else I can do with my 'porting?"

It really hurt to say it. "No."

"Then I got no choice. I'm going to *be* somebody, if it takes the rest of my life." He hesitated. "But if it's going to bother you that badly, I guess I could go on from here on my own. You've taught me a lot, Coach, and I won't forget it. Maybe I could work out by myself and spar with some of the guys at the Club or at school. No use giving you an ulcer over this."

We had reached the dry goods store that I was going to, located with a few other small businesses right at the top of the hill that sloped downwards towards the river. "Would you like a ride the rest of the way?" I asked as an afterthought.

He shook his head, pointed down the hill, "I'm meeting Jenny right under the cliff there."

We both got out of the car and stood by my door. Another car went by me and pulled over fifty yards farther down the hill, parking right in front of Tom's butcher shop. Probably vacationers from one of the cabins down the road, I decided, seeing the trailer hitch and extra-large sideview mirrors. A man and woman got out and went into the shop, leaving a one- or two-year-old kid in a car seat in the front. I hoped they had set their parking brake. The hill was pretty steep.

"Sounds like everybody else in town is down there already," Ernie commented.

"Yeah," I agreed. Even from here the soft roar of a crowd was easy to hear. "Better hope Jenny's got a place staked out." I looked down the hill, but I couldn't see anyone, of course. The way the engineers had built the road, it followed the hill for a few hundred yards and then made a sharp turn to the left. It was to make the grade safer, I guess, because right after the road turned the hill got suddenly steeper all the way down to the riverbank: the "cliff" Ernie had mentioned. It wasn't really much of a cliff, as cliffs go, but it was the closest thing to one for a hundred miles and everyone called it that. But because of the slope it wasn't possible to see the riverbank from here.

"Well, I guess I'll be seeing you, Coach," Ernie said after an awkward silence.

"Look, think it over, will you?" I urged. "I don't want you to think you have to cut out of the team completely just because of me."

"It's okay, I'll—"

He broke off suddenly, gripping my arm tightly. His eyes wide as he stared down the hill. I turned to look.

The car with the fancy mirrors was rolling down the hill. Already it was picking up speed.

Maybe Ernie saw the kid in the car.

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Maybe he heard the crowd beneath the cliff, or maybe he was thinking of Jenny. Probably it was all three. But before I could break the shock that had glued to the blacktop, Ernie was off like a rocket, tearing after that car with all the speed he could muster.

And not only all his speed. He was 'porting, too, all but invisibly gaining himself an extra foot of distance every two seconds. Not much, but every bit was worth something.

Out of the corner of my eye I saw the car's owners come out of the butcher shop. Her scream and his curse as they saw what was happening finally got my feet moving, and the three of us took off down the hill. I don't know what they were thinking, but I knew we didn't have a hope in hell of catching that car. What I did know was that I was suddenly terrified for Ernie.

Another few seconds, and Ernie had reached the car. He didn't waste time trying to open the door, but instead put one hand on the edge of the roof and the other hand on the mirror and vaulted onto the mirror's support posts. Twisting into a crazy sort of fetal position with his legs hooked around the mirror posts, he reached through the open window and grabbed the wheel.

I wanted to swear, but I needed all my breath for running. The car was starting to turn now, but only slowly, and it was already dangerously close to the edge of the cliff. I couldn't see how Ernie could get it turned in time, and if he couldn't he was going to go through the guardrail with it. There was no way he could drop off from that position without killing himself. A horrible thought flashed through my mind, that Ernie wouldn't have done something this suicidal if he hadn't been depressed by my talk with him. I silently cursed myself and tried to speed up.

The car was well into the curve now, but Ernie almost had the wheels turned enough. For a second I thought he was going to make it. Then the car slammed into the guardrail.

The woman running behind me gasped. Ernie's legs flailed a bit as the jolt threatened to throw him off, but he managed to hang on. The car had apparently bounced off the rail, because it was still on the road, and as I watched it bounced against the barrier two more times. Then, incredibly, it was solidly on blacktop again. The wheels were still turned, though, and as the road straightened out the car kept turning. It crossed both lanes and nosed into the ditch on the side away from the cliff. There, finally, it stopped, throwing Ernie off.

I didn't even glance into the car to see if the kid was all right, but headed straight to Ernie. He looked up at me out of a face dripping with sweat and smiled weakly. Then he fainted.

The hospital couldn't find anything except bruises on Ernie, but he was so exhausted they insisted on keeping him there overnight. I got in to see him about ten minutes after visiting hours started that evening. Jenny Cooper was already there, sitting by his bed

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and holding his hand, talking quietly with him.

"Coach Morrissey!" he said when he saw me at the door. "C'mon in."

"How are you doing?" I asked, pulling a chair to the foot of his bed.

"Great. A little tired is all."

"I can imagine," I said, thinking of all the 'porting he had done. "I guess everybody in town knows what you did today, Ernie. You're a real hero."

"Yeah," he said slowly. "You know, Coach, this isn't really how I expected it to be."

"Oh?" I thought I understood.

"No. I guess I always thought it would be the greatest thing in the world to have everybody telling me what a great guy I was. It's funny, but it doesn't seem all that important anymore. I was feeling good about what happened long before anybody started telling me I was a hero."

"It's like I told you a long time ago: what matters isn't the name but the guy who wears it. When you start feeling good about yourself, it doesn't matter a whole lot what anybody else thinks about you. Well, most anybody, I mean," I added, smiling at Jenny. She smiled back.

"Yeah." Ernie was silent for a moment. "Coach, will you be mad if I drop out of the boxing team? I know you were hoping I'd fight in the Golden Gloves tourney, but—well, I'd like to spend more time on my schoolwork. And besides, Jenny thinks boxing's too dangerous."

"If it's what you really want, Ernie, go ahead. I hope you'll come in and say hello when you can, though."

He grinned. "Sure thing."

"Good. Well, I guess I'll leave you two alone." I headed toward the door, but then turned back. "Oh, by the way, I talked to Chief Dobbs earlier. He told me that car hit the guardrail pretty hard those three times. Says it was a miracle you didn't go through it and over the cliff."

Jenny tightened her grip on Ernie's hand, but he just smiled slightly. "I believe in miracles, Coach. Don't you?"

"Sure do," I said, and in my minds eye I could see Ernie clinging to that car, 'porting it an inch at a time, six inches a second, backing it away from that edge. And I looked into Ernie's face and saw the peace and self-respect that was finally there. Ernie Lambert was a real *somebody,* and for the first time in his life he knew it. "Sure do," I repeated.

I still hear from Ernie a couple of times a year. He and Jenny are married and have two kids, and he's a CPA out in Denver. He doesn't box anymore, but plays some amateur baseball now and then, and Jenny tells me he's pretty good at it. It seems he's got this wierd little *jerk* of some kind that he puts in the middle of each pitch. It drives the batters crazy.

As for me, I'm keeping my eyes open. Somewhere in this world there has to be someone else who can 'port like Ernie, and the guy just might be big enough and mean enough to become a real heavyweight pro.

I can always hope, anyway. ■

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The Reference Library

by Thomas A. Easton

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Paradox: The Case for the Extraterrestrial Origin of Man, John Philip Cohane, Crown, price unknown

Much of the best science fiction in my memory—and in yours too, perhaps—can be lumped into a single category. Many of my favorite stories are *yarns*, the stuff of myth and legend, hero tales, tall tales, tales told over a tavern's beer, and I have long thought that a nifty title for an SF bookstore, an SF book review column, or even an SF mag would be "The Yarn Shop."

This is not to say that the only really good science fiction sounds like lies. That just isn't so. No fiction ever Species," a cogent remark on the works unless it induces the reader to identify with the characters and their situation and care what happens. To that extent, no successful fiction can seem a lie. There has to be at least some verisimilitude. When this quality exceeds certain vaguely sensed bounds, a story ceases to be a yarn and becomes something else, a slice of life, a glimpse of a problem or a dream, or even an allegory. And some such stories do stick in the mind (*Childhood's End* is a classic example).

The nonyarns that stay with us, though, are far fewer than the yarns. The reasons why are not something I'm prepared to pontificate on at this stage of my life, but I will hazard one guess at one reason: since the yarns are often less topical, they date less quickly and are reprinted more often; we remember them partly because we read them more frequently. And this brings me to the first item on this month's agenda. I have before me the first volume of **Galactic Empires**, a generally tasty collection of yarns assembled by Brian Aldiss and paperbacked at $2.25 by Avon last February. The stories all supposedly involve some aspect of empire—building and maintenance in this volume—but one or two seem to do so only by editorial courtesy. The very first story in the book, "Been A Long, Long Time," is a very amusing piece of Lafferty, a twist on the monkeys, the typewriters, and the Shakespeare, but it has nothing whatsoever to do with empire. The first yarn to deal with the topic is H.B. Fyfe's "Protected

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human propensity for violence. Michael Shaara's "All The Way Back" is a biting look at destiny. Poul Anderson's "The Star Plunderer" is pure swashbuckle, valuable mostly for its effect on the glands. The oddly truncated chunk of Asimov's *Foundation* should have been left out; maybe this *is* the way it was first published, but at this late date, Aldiss does the larger work no service by including what is really an excerpt. The rest of the book includes pieces by Cordwainer Smith, Idris Seabright, Clifford Simak, James White, and more, all delicious fragments of the past, all well flavored with a bit of the old "manifest destiny." By and large, the book is worth reading.

Less recommendable is **Captain Empirical** by Sam Nicholson, a $1.95 Analog Book from Ace. You know the stories if you've been following this magazine for any time at all: Captain Schuster is the archetypical "man who can"—rid a ship of a crooked purser, lick the pirates who want to take over the sheik's new atomic yacht, expedite a space program, or bring an asteroid mining ship home even after it's been mired in space quicksand. The book is a "novel" constructed by surrounding a handful of stories—the "Schuster tapes"—with a loose narrative that would never have made it on its own. The science will raise your eyebrows at times, but I can forgive that as long as it works in the story, which it does here. I have more trouble in accepting that the individual stories are uneven in quality, probably reflecting the author's progress as he learned his trade, and that the book as a whole just doesn't hang together. The fault for the latter is probably the publisher's. "Anthologies don't sell," said Joe Pub to Mike Ed. "Tell this Sam guy to turn it into a novel." Well, Mike did, Sam did, and we're stuck with it if we want to see Captain Schuster in action once we've loaned the magazine to a friend who moved to London.

A so-so recommendation is **Binary Star #2.** *Binary Stars* are a nice idea from Dell. For $1.75, they'll sell you two short novels or novelettes between one set of covers, both of them right side up, unlike the old Ace Doubles. In addition, you get each writer's comments on the other's work. A nice idea, but less than marvelous in execution, at least this time. The auctorial remarks read like mutual back-patting. The first story is Gordon Eklund's "Twilight River," the tale of an ingenuous, misshapen vagrant's search for a mythical utopia in a far-future world run by aliens who long ago squashed human expansionism and confined our species to its home world. It made me feel as if I was watching the local high schools's class play—none of the characters seemed to believe they were real. The companion piece, F. Paul Wilson's "The Tery," is a much better story of persecution of the present results of long-past genetic manipulation. The results include variant humans with psi talents and variants with bestial form. One of the latter is the hero of the story, a tery (from teratology) who tries to assert himself as fully human. He talks, he thinks, he feels, and he dies on a cross. For all the difference of his form, he is easier to identify with than Eklund's characters. The tale is flawed only by the lack of some

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justification for the final crucifixion scene, on which the whole story turns. The ancient Romans used the cross as a standard mode of execution, but here it appears only once. Nevertheless, the book is worth buying for this story alone. Be warned, though, that a *Binary Star* seems to resemble many binary stars—one member of the pair is bright, while the other is dim.

Now here's an apt cliche for you: a good read. It genuinely fits James Schmitz's **Legacy** (Ace, $1,95). Schmitz is the creator of Analog's own Telzey Amberdon and *The Witches of Karres,* both of them something I, for one, wish we had more of. Well, here's more like Telzey. The name is Trigger Argee, but she's just as innocent, just as sexy, just as super-competent, and just as much fun to watch in action as she helps solve the mystery of the plasmoids, mysterious quasi-biological things left over from the long-gone days of the Masters of the Old Galaxy. The book was first published in 1965, but it received very little attention then and well deserves everything it gets this time around.

Thomas Sullivan's **Diapason** (Condor, $1.95) is the tale of an overcrowded and unstable Earth faced with a choice: will future generations be produced naturally, like the old, or cloned from a few individuals selected and engineered for such characteristics as mental stability? The choice will be made according to the results of a peculiarly heartless experiment: take the eight members of a clone, all raised in different environments, put them down in a stressful situation (a treasure hunt on Mars), and see whether genetics or environment is the greater determinant of behavior. Not surprisingly, given the temper of the present, environment wins and the hero gets the girl. The writing's not bad, the story moves right along, and the ending is at least partly satisfying, but the book is seriously flawed by its unlikely, if intriguing, premise. I seriously doubt both that any modern scientist would consider standardizing the species and thus weakening its potential adaptability to future crises and that such an experiment has been possible since the Allies licked the Axis or will be possible in Diapason's near future, given all the present concern about human rights.

Speaking of cloning, that's one hot topic right now. David Rorvik turned on the heat with *In His Image* last year, and now everybody's getting into the act. One of the everybodys is David Shear, who back in 1972 published a sad excuse for a novel with Walker. Pinnacle paperbacked it in 1974, and now it's back again, at $1.95, just in time to catch a ride on the bandwagon. The novel is **Cloning**; its premise is that clones exist and can link minds (something I consider so much wish-fulfilling fantasy); its plot is so-so, and its writing is pedestrian. And it reminded me of Sturgeon's Law: ninety percent of everything is c**p; writers, stories, and, I suppose, even publishers. How do they stay in business? They pay their authors as little as they possibly can, so little that they tend to get everybody else's rejects. And they sell what they publish to the same folks who kept P.T. Barnum in business.

Thomas Monteleone's **Secret Sea** (Fawcett, $1.75) is based on the notion that Jules Verne's stories were factual accounts of events in an alternate

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world. That's not a bad notion, though it's been used often enough before. Monteleone does a reasonable job with it too, leading his hero to an old diary that tells of the fluxgates between the worlds and taking him through one to reencounter Captain Nemo and Robur the Conqueror. The trouble is that the humor of the opening pages too soon fades to be replaced by plastic Verneer. The hero is no hero, no Vernian man-who-can, but an observer. The book is a travelogue, spiced by a Nemo-Robur conflict and Nemo's final triumph, and it's not terribly satisfying. Though we should bear in mind, of course, that Verne's own stories were travelogues and action was often secondary to him too.

Last—and least—for this month's fiction is a $7.95 paperback from Strawberry Hill Press. This is Neil McAleer's **Earthlove,** billed as "A Space Fantasy." It's nice to see such publishers getting into the SF act, but I do wish they would pick better stuff to peddle. *Eathlove* is a dramatization of the love conquers all/makes the world go round/etc. hatful of cliches. It's a saucerian journey, an allegory, complete with gradual revelations of gross parallels with Earth's meaner features and a final revelation of cosmic truth. It's not done too badly—it is readable—but it's a form that was done to death many long years ago. If it's worth buying, it's because of the one intriguing concept it contains, one that is in fact essential to the story. This is the notion that our "expanding" universe is a sentient "Field" embedded in a universe containing infinitely many other such "Fields," all expanding and contracting independently. It thus becomes conceivable that intelligent life can escape its native "Field" and its eventual contraction to a new monobloc and colonize a youner "Field," thus allowing physical and mental evolution to pro-

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ceed indefinitely, to undreamed of heights. The closest science fiction has come to this idea before, so far as I know, is in the concluding section of James Blish's *Cities in Flight* series. It tickled me then, and it does so again, despite the context.

Getting away from the fiction, we can start with a blend, Jerry Pournelle's **Black Holes** (Fawcett, $1.95). This is a collection of three poems, a hatful of articles by Pournelle and Robert L. Forward, and a dozen stories by Pournelle, Larry Niven, Greg Bear, Poul Anderson, and others (there is even a Papa Schimmelhorn by Reg Bretnor). Every contribution has something to do with black holes, and herein lies the book's major weakness: despite the variety of contributors, everything is much of a muchness. In addition, almost everything dates from very recent years, so there is none of the freshness the passage of time can restore to a story. Furthermore, too many of the contributions come from just two magazines: Analog and *Galaxy*. Not that the book is bad. On the contrary, the science is skillfully presented, the fiction is invariably readable, and it will feed you everything worth knowing or dreaming about black holes. But I do wish Pournelle had waited another five years to publish the book, and then broadened his sources a bit.

No blend, but the pure quill, is **Worlds Beyond,** a collection of edited transcriptions of radio programs and a few articles prepared by Larry Geis, Fabrice Florin, Peter Beren, and Aidan Kelly of the New Dimensions Foundation and published as a $6.95 paperback by And/Or Press. It's a compendium of views, opinions, and tidbits on everything you can think of connected with the coming expansion to space—human feelings toward it, colonies, industries, propulsion mechanisms, SETI, and so on. It's got people like Bucky Fuller, Governor Jerry Brown of California, Russell Schweikart, Gerard O'Neill, G. Harry Stine, Cousteau, and many more. It's the kind of stuff Analog readers are more than familiar with, and for that reason, it may be a book to buy as a gift for someone you want to turn on to the future as you see it. But—and I seem to be finding a lot of buts this month—there is a drawback. The editors tossed in a fairly large chunk of ufology, both the serious (represented by J. Allen Hynek) and the psychoceramic varieties. There's some value to this, since it gives us Analog types a glimpse of the fringe; too, the book may be aimed more at that fringe. Another but—the book includes a piece by Timothy Leary, Western Civilization's best example of psychedelic mindrot. But buts aside, there's one big plus in Barbara Marx Hubbard's image of moving into space as a birth process, a necessary stage in the maturation of the human species. If you do gift someone with the book, be sure to leaf through it before you part with it. I expect you'll find something worth reading.

You might have gathered that *Worlds Beyond* has a few soft—even mushy—edges. A book that's all hard-edged, as much so as a Voyager spacecraft, is **Planetary Encounters: The Future of Unmanned Spaceflight,** by Robert M. Powers (Stackpole, $13.95). It is a history of the theory and practice of space exploration, from Heraclides of Pontus (360

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B.C.) to the currently speculative ultraplanetary probes. As the subtitle indicates, the focus is on the machines that carry senses away from our planet, so Apollo never gets a mention. The Mariners, Pioneers, Vikings, and Voyagers, however, are covered in detail and significance of their results is outlined. The book was published too early to include any of the marvelous data coming in this year from the Voyagers, but the gap is filled by an overly detailed description of the "mission plan" that might have been lifted whole from NASA press releases. The same holds true for the missions that are still on the drawing boards (and that will probably stay there if Congress has its way with the pursestrings): Galileo, to Jupiter; the Mars rover; the comet encounter; and all the many others. The book is a forward-looking reference volume, useful to anyone who cares about following developments in space exploration, to science fiction readers and writers, to teachers and politicians. The writing is at times atrocious, but the book is attractively put together, with plenty of photos and drawings, tables of planetary data, a glossary, and an index. Buy it if you feel the need, but I would suggest waiting for the new edition that will have to come along in a few years to take account of all the data now pouring in.

Now, I have a little space left and I am going to use it to indulge in a little bubble-pricking. It's good, clean, wholesome fun without any real victim. Unless you're the writer I'm going to work over.

The writer is John Philip Cohane. In 1976, Crown published his **Paradox: The Case for the Extraterrestrial Origin of Man,** and it probably won't be long before the paperback shows up. Whatever you do, don't buy it. Cohane is a scientific von Däniken, if such a beast can possibly exist. A von Däniken, of course, is a nut, a crank, a crackpot who sees flying saucers under his teacup and makes up "facts" out of whole cloth to deceive the innocent. A scientific von Däniken sees saucers too, but when he tries to convince others of his visions he uses real evidence, albeit well picked over, preselected, and freely interpreted. Even then, however, he must often be content less with "proving" his case than with raising doubts. Such is Cohane. He refuses to believe the biologists on evolution, preferring the long superseded ideas of the Old Guard, he listens hard to myth and legend, and he concludes that "Far from belonging to a creature who evolved in isolation on this planet . . . *Homo sapiens'* psyche is essentially what one would expect to find if he had evolved over many millions of years in outer space and then arrived here . . . much puzzling material would be immediately clarified if *Homo sapiens* had evolved in outer space." That's the end of the title argument, on page 52. The rest of the book is an appeal to the conspiracy theory of history to shoot down evolution, support UFOs, and enshrine claptrap. The book is a farraginous grab-bag of mixed sense and nonsense assembled by a man whose ignorance, sloppiness, and lack of intellectual honesty are well illustrated by his statement that radio telescopes detect *sound waves.*

'Nuff said. ■.

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Dear Mr. Schmidt,

Your editorial, "Liberal Education," in the April issue of Analog was, to say the least, thought provoking. One of the thoughts it provoked was how can anyone be proud of ignorance.

I attended three colleges before I gave up and went to a technical school and learned computer programming. All three schools were liberal arts colleges. In all three, the science and math departments seemed to delight in making their subjects harder to understand than necessary. There were a few individuals who tried very hard to teach their subjects clearly, without confounding their students, but at one college the administration actually reprimanded two biology professors for doing so. At another, they openly admitted, nay, they boasted, that if less than 50% of the freshmen flunked biology, someone was not doing his job of obfuscating properly.

Perhaps the people who are proud of their ignorance are reacting against the type of educator who creates dark mysteries when his job is to enlighten. (I differentiate between educators and teachers. A teacher is someone who teaches. An educator is someone who spends most of his time writing articles for Educational Journals on the Process of Education, which even other educators cannot understand due to the excessive amounts of jargon which, according to the Surgeon General, may be carcinogenic. 'Nuff said?)

The humanities have their share of educators, to be fair, but one *can* read *Moby Dick* or Shakespeare on his own while Einstein's theories are somewhat harder to understand in the original. Nor are colleges the only institutions affected by those who seem to seek to maintain an information monopoly. Have you ever tried to read an IBM manual? My school spent two weeks teaching us how to decifer the gobble-dy-gook and how to find information in spite of the misleading and incomplete index. The insurance industry, legal profession, and IRS rank high on the enormous list of offenders.

To get back to your editorial, one solution to the anti-science bias is to present science clearly and simply. I do not mean that one must oversimplify, but Isaac Asimov and George O. Smith deal with complex subjects clearly and simply without trivializing them.

Our society *is* large, complex, and unwieldy, and the process of change *is* slow and ponderous, but I believe it

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Brass Tacks

can be done. If we do not want to experience a resurgence of the Dark Ages, it must be done. Individuals probably have the most control over local school boards, and that's an excellent place to start. There are also Alumni Associations, student groups, and state colleges which depend on our tax money for a large portion of their budgets.

I read somewhere that one letter, actually mailed and received by executives, heads of institutions, congressmen, etc., has the impact of 10,000 voices (those who feel the same way but didn't take the trouble to write). A group (about fifteen people is the optimum size for stability) has more impact than an individual.

In the meantime, Mr. Editor, keep doing the fine job of teaching you have been doing. Your magazine, and others, do turn on a few, and possibly more than a few, minds to the wonders and excitement of science.

Margaret E. Tobey
225 Willow Ave. Ext.
N. Plainfield, NJ 07063

You raise some good points, which hopefully should provoke some well-placed embarrassment. I recognize that explaining technical matters simply and clearly is a special skill not everyone has, but I fully agree that any conscientious teacher must try, *and try hard. I remember the case of a colleague who was once downgraded in a graduate student seminar because an audience survey revealed that 70% of his audience understood him. His professors said that was too many and proved that he was talking at too low a level.*

This is education?

Dear Mr. Schmidt:

Some of your readers may be interested in entering our gravitational experiments contest. Most of the experiments only require modest budgets, even though they represent searches for effects predicted by general relativity.

Einstein's gravitational theory predicts that a rotating mass will 'drag' its field (or the spacetime coordinates) along in the spin direction. The heavier the spinning object and the faster it rotates: the stronger the predicted effect. If the effect is acceleration-dependent (with rotation regarded as a form of acceleration) it will obey a first power law, not distance squared, and thus the interaction may be much stronger than generally believed.

The above predicts maximum effect in the 'equatorial plane' of the spin-

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ning mass and zero effect in line with spin axis. Thus it is predicted that small test-objects (Cavendish-type torsion balance or other gravity detectors) will tend to move away from spin axis towards equatorial plane.

The third experiment is based on another electrodynamics analogy—as are all the predictions of general relativity. An electrical charge, in an elliptical orbit around a primary charge, moves towards a constant-velocity orbit, i.e. a circle. A parallel gravitational effect will be difficult to detect but again, high rates of acceleration and deceleration may magnify the interaction (gravitational field 'friction') and bring it within the realm of observation.

What are the chances that these experiments will produce interesting and valuable results? In this respect it should be noted that the two, small martian moons (captured asteroids) the large Jupiter moons, most of Saturn's moons and all five moons of the severely 'tilted' Uranus system obey the hypothetical, relativistic rules as they apply to (1) orbiting direction, (2) orbital plane and (3) shape of orbit: circular.

The remaining, three experiments are tests of the longstanding axiom that gravitation is not temperature dependent. Special Relativity showed that a temperature change, produced by adding energy to a system, did produce a mass change. However, self-heating objects are used in these experiments. A large, heavily insulated object with a self-energizing core is required (electromagnetically closed system). The famous Dicke experiment is repeated with the aid of a 'giant' torsion balance with the mass at one end of beam, self-energizing. Any gravitational effects of self-heating object, relative to the sun, will rotate torsion-beam back and forth with a 12 hr. period. The next experiment utilizes same, self-energizing object relative to small, laboratory test-masses; if the gravitational interactions change during self-energization it will indicate that the concept of 'absolute' gravitational mass is invalid. The last experiment is similar to above but represents a test for changing *inertial* mass during self-energization. (A predetermined acceleration-force is applied to object, before and after temp. increase.)

Readers interested in entering this contest (cash prizes for individuals, honorary prizes for companies or universities) may obtain details, specs., forms etc. from THE ANNEX, P.O. Box 3142, Redondo Beach, Calif. 90277.

Sam Elton

714 Longfellow Street
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Dear Dr. Schmidt:

Henry Group's letter in the March "Brass Tacks" gets very agitated over our *Analog Yearbook* article, "New Maps of Science Fiction." He says he liked it, but he kicks it a couple of times in sensitive spots. Great fun: controversy.

Mr. Group complains we love computers too much, and estimates we could have done the calculations "with pencil and paper in the space of a week." Yeah? The main reason I like computers is because I've *tried* doing these things by hand. Oh, the agony! Each of the different correlation coefficients we use (tau, gamma,

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Pearson's r) is figured through a lengthy series of procedures involving seemingly endless repetitions. Mr. Group suggests we might get by with a hand-held calculator, but you need a programmable machine to do the Pearson's r statistic efficiently, and none of the calculators I've seen are any good for doing tau or gamma.

Except for a final long division, calculating gamma involves laborious sorting of data, the kind of thing computers do especially well. Rather than "pencil and paper," you need the living room floor to heap the questionnaires in umpteen piles. Since we used seven-point scales for most of our questions, handmade gammas demand 7 x 7 = 49 piles of questionnaires on the rug. Then everything has to be counted several ways around, added up just right, and then you may grab the calculator for the long division that gives you the coefficient. Repeat from scratch for each gamma. My best time is a half hour per gamma, for 125 questionnaires. Pearson's r takes about as long, even with my HP-80.

In one of our tables we show how correlations can identify the styles of 27 authors in terms of six types of literature. To begin with, we need 27 x 6 = 162 figures, about 80 hours' work by hand. A diagram in the article showed associations linking pairs of authors, based on an unpublished (unpublishable, unendurable) table with (27 x 26)/2 = 351 coefficients. There's another 175 hours of supreme mathematical torture, if done by hand. Group hoped we could do the job in one week. In fact, once we count in the various other analyses we did, some of them checking our published findings with other methods, we are talking about *months* of hand calculation, not just one week. (As the old pun goes, such a job makes one weak, not one week.)

A thousand people filled out two of my new questionnaires at last September's World Science Fiction Convention in Phoenix, Arizona. (Thanks folks!) Each questionnaire had 150 items in one of five different *random* orders designed to prevent artifactual correlations. Before analysis, data from each questionnaire had to be rearranged in one master order, checked, frequencies extracted: nearly two hours, by hand, for each of the thousand questionnaires. The friendly computer charged less than twenty bucks. I'm preparing an article based on a small fraction of the data: factor analysis of 36 science fiction movies rated by 200 respondents. That would have taken another couple of thousand hours by hand. Factor analysis *begins* with a correlation matrix, in this case (36 x 35)/2 = 630 correlations, which with 200 respondents would take nearly an hour a piece by hand. Does Mr. Group really want me to work for a penny an hour? Would he? Bless the computer!

Mr. Group also complains about the very simple political question used in the *Yearbook* article. It asked respondents to check one of the following boxes: Radical, Liberal, Moderate, Conservative. Yeah, dumb question. Group calls it "laughable." Right. Ha. Ha. I laugh, or at least smile, every time this question works. About a week ago, the computer and I tabulated this apparently idiotic question with the more cumbersome political question used in national surveys

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every year by The National Opinion Research Center. NORC's question has been validated many times, and has seven points, from 1 = "extremely liberal" to 7 = "extremely conservative." Based on data from 379 respondents to one of the new science fiction questionnaires, my laughable politicial item correlates highly with NORC's item, a gamma of 0.92 out of a possible 1.00. On the NORC scale, the Radicals had an average score of 1.24; Liberals averaged 2.23; Moderates 3.79, and Conservatives 5.63. Not a perfect correspondence, but pretty damn good. Most times, I use more than one political item in my questionnaires, but the four-box one does a good job and is easiest to discuss in articles.

Mr. Group doesn't want his complex political views squashed into a single questionnaire box. Me neither. Our survey research is not designed to probe individual attitudes, but to explore very general relationships in data from masses of people. And in this respect my laughable question becomes cryable. It depresses me how well the four dumb boxes do in fact measure the pathetically simple variation in American political opinion. Not what you'd call an ideologically complex society, this USA.

Group seemed to enjoy our article, although he seems to wonder what the research is all about. These projects are a heap of fun for me, and readers may discover a refined kind of amusement in the charts and coefficients. Surprising things have been hopping out of the computer recently.

There ought to be a science of art and literature, but academic journals in these fields despise scientific methods and quantitative studies. Science fiction is much more hospitable to new ideas, even appallingly simple but effective ideas like arithmetic.

William Sims Bainbridge

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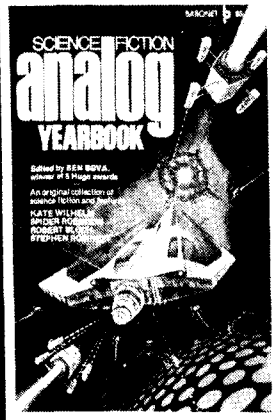

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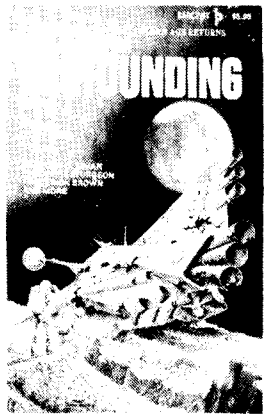

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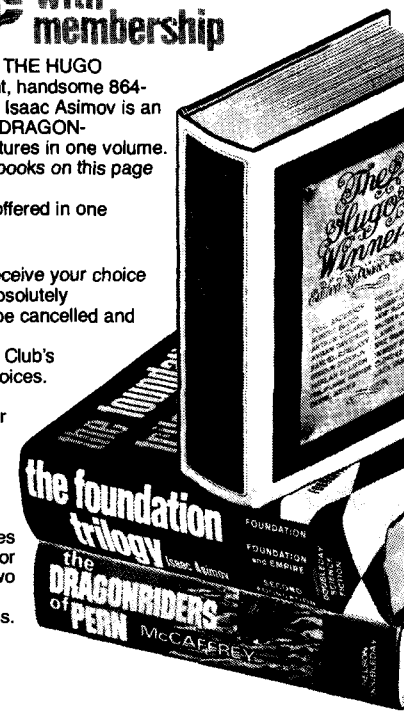

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